APPENDIX D

BIOLOGY

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D.0 BIOLOGY

This appendix provides more detailed information for some of the topics covered in Sections 3.8 and 4.8, *Biological Resources,* of this LEIS. It provides a summary of some of the ecological studies conducted that describe existing biological resources on McGregor Range. These studies are being conducted to support the INRMP currently being prepared by the Army. In addition, a description of baseline biological resources on McGregor Range are required to adequately describe environmental impacts of the alternatives. This appendix is used in the impacts analysis for biological resources in Section 4.8.

The major focus of this appendix is to provide wildlife data (especially tabular data) that is too extensive to include in Section 3.8. The discussions of wildlife biological resources in Section 3.8 of the LEIS are summaries of the information presented in this appendix. The description of plant communities on McGregor Range, including vegetation maps, appears in Section 3.8, and there is not an expanded discussion of these resources in this appendix. There is a discussion of wetlands and arroyo-riparian drainages in this appendix that is summarized in Section 3.8.

D.1 VEGETATION

A description of plant communities on McGregor Range, including the number of acres of each type, as well as a vegetation map, appear in Section 3.8.

D.2 WETLANDS AND ARROYO-RIPARIAN DRAINAGES

Wetlands and arroyo-riparian drainages (Waters of the U.S.) have been mapped and characterized on McGregor Range and elsewhere on Fort Bliss (U.S. Army, 1998h, 1997d). Wetlands delineation follows the USACE protocol in the "Army Corps of Engineers Wetlands Delineation Manual" (U.S. Army, 1987). To qualify as a USACE jurisdictional wetland, it must have hydric soil, be saturated to the surface sometime during the growing season, and contain wetland plant species (U.S. Army, 1987). Waters of the U.S. include "water such as intrastate lakes, rivers, streams (including intermittent streams)" (33 CFR 328.3(a)(3). Probable Waters of the U.S. have been mapped on McGregor Range (see Figure 3.7-1 in Section 3.7). These inventories of wetlands and Waters of the U.S. are provided for planning purposes and the boundaries of the wetlands and Waters of the U.S. have not been determined. The boundaries of wetlands and Waters of the U.S. will be delineated for site-specific projects and a final determination by the USACE district engineer is needed before a delineation is confirmed. Actively maintained man-made features such as stock tanks may be nonjurisdictional. However, abandoned stock tanks and other man-made features may be regulated if they conduct and/or hold surface water (U.S. Army, 1998h).

Observations were made at 226 locations on McGregor Range and the South Training Areas including arroyo-riparian drainages, stock tanks, and other water resources. Data such as major plant species, and depth and width of channel, were recorded. A total of 49 sites were analyzed in greater detail including data on plant species and percent cover, hydrology, soils, and surrounding upland vegetation. Based on this analysis, arroyo-riparian drainages (probable Waters of the U.S.) on McGregor Range included 1,228 dry washes with distinct stream beds and stream banks covering 1,874 miles. In addition, 11 natural dry lakes, with distinct ordinary high water marks totaling 127 acres, and 79 artificial bodies of water, such as sewage treatment ponds, storm water retention basins, and stock tanks totaling 802 acres, were mapped on McGregor Range (U.S. Army, 1998h).

The vast majority of arroyo-riparian drainages on McGregor Range do not qualify as USACE jurisdictional wetlands but, as indicated above, thousands of miles of these waterways are probable Waters of the U.S. Perennial riparian corridors of the western U.S. have been studied extensively and the density and diversity of flora and fauna in many of these areas determined. However, the flora and fauna of arroyo-riparian drainages on McGregor Range and elsewhere have been partially investigated (Cockman, 1996; Kozma, 1995).

Cockman (1996) studied four arroyo-riparian drainages on McGregor Range in Culp Canyon; two were in the desert shrublands of the Sacramento Mountains foothills at elevations ranging from 5,900 feet at the headwaters to 5,480 feet at the tailwaters. The other two drainages were also in the desert shrublands in the submesa at elevations ranging from 4,920 feet (headwaters) to 4,500 feet (tailwaters). The dominant shrubs in the foothill drainages were skeletonleaf goldeneye (*Viguiera stenoloba),* little leaf sumac (*Rhus microphylla),* largeleaf sumac (*R. trilobata*), and Apache plume (*Fallugia paradoxa*). Cutleaf bricklebush (*Brickellia laciniata),* Mexican silktassel *(Garrya ovata),* and desert willow (*Chilopsis linearis*) were found only in the main channel (obligate species). The dominate shrubs in the submesa drainages were desert willow, Apache plume, four winged saltbush (*Atriplex canescens),* little and big leaf sumac, and honey mesquite (*Prosopis glandulosa).* Creosotebush (*Larrea tridentata),* skeletonleaf goldeneye, and tarbush (*Flourensia cernua)* were also common. Desert willow and Apache plume were obligate in the main channel.

In the desert shrub plant communities at and near the Sacramento Mountains foothills, Cockman (1996) determined that the following vegetation parameters characterize arroyo-riparian drainages on McGregor Range:

- Shrub, tree, and forb cover are higher on the main channel than the surrounding area;
- Species richness of shrubs, trees, grasses, and forbs are higher in the main channel than all other locations;
- Heights of shrubs along the main channel are nearly twice that of shrubs in the uplands; and
- Obligate species such as desert willow tended to be taller than nondrainage species.

Obligate species at one elevation may occur outside of the drainage at another elevation. For example, Apache plume is obligate in the submesa drainages but occurs outside the drainages in the foothills. Species such as little and big sumac, which occur at many locations in the foothill and submesa drainages, may be obligate species in desert floor of the Tularosa Basin (Cockman et al., 1996). Little sumac has been observed in sandy soil in areas apparently outside of drainages in the Tularosa Basin.

D.3 WILDLIFE

D.3.1 Amphibians and Reptiles

A total of 8 species of amphibians and 39 species of reptiles have been observed on McGregor Range; an additional 19 species of amphibians and reptiles have the potential to occur (U.S. Army, 1997d, e,1996e) (Table D.3-1). Seven of the amphibian species are toads and the eighth species is the barred tiger salamander (*Ambystoma tigrinum mavortium)* which is found in stock tanks on the Otero Mesa and in the Tularosa Basin. Numerous Great Plains toads (*Bufo cognatus),* New Mexico spadfoot (*Spea*

Table D.3-1. Amphibians and Reptiles that Occur and Could Occur on McGregor Range, Otero County, New Mexico

Species		*Occurrence on McGregor Range*	
Common Name	*Scientific Name*	*Known*	*Possible*
Barred tiger salamander	*Ambystoma tigrinum mavortium*	●	
Great plains toad	*Bufo cognatus*	●	
Western green toad	*Bufo debilis insidior*	●	
Red spotted toad	*Bufo punctatus*	●	
Woodhouse's toad	*Bufo woodhousii*		
Southern woodhouse's toad	*B. w. australis*		●[a]
Woodhouse's toad	*B. w. woodhousii*	●	
Canyon tree frog	*Hyla arenicolor*		●
Bullfrog	*Rana catesbeiana*		●
Couch's spadefoot	*Scaphiopus couchii*	●	
Plains spadefoot	*Spea bombifrons*	●	
New Mexico spadefoot	*Spea multiplicata*	●	
Western painted turtle	*Chrysemys picta bellii*		●
Yellow mud turtle	*Kinosternon flavescens flavescens*		●
Box turtle	*Tarapene ornata*		
Desert box turtle	*T. o. luteola*	●	
Ornate box turtle	*T. o. ornata*	●	
Chihuahuan spotted whiptail	*Cnemidophorus exanguis*	●	
Trans-Pecos striped whiptail	*Cnemidophorus inornatus heptagrammus*	●	
Western marbled whiptail	*Cnemidophorus marmoratus marmoratus*	●	
New Mexico whiptail	*Cnemidophorus neomexicanus*	●	
Colorado checkered whiptail	*Cnemidophorus tesselatus*	●	
Desert grassland whiptail	*Cnemidophorus uniparens*	●	
Texas banded gecko	*Coleonyx brevis*	●	
Greater earless lizard	*Cophosaurus texanus scitulus*	●	
Chihuahuan collared lizard	*Crotaphytus collaris fuscus*	●	
Great Plains skink	*Eumeces obsoletus*	●	
Longnose leopard lizard	*Gambelia wislizenii wislizenii*	●	
Mediterranean gecko	*Hemidactylus turcicus*	●	
Earless lizard	*Holbrookia maculata*		
Speckled earless lizard	*H. m. approximans*		●[a]
Northern earless lizard	*H. m. maculata*	●	
Texas horned lizard	*Phrynosoma cornutum*	●	
Short-horned lizard	*Phrynosoma douglasii*		
Desert short-horned lizard	*P.d. ornatissimum*		
Mountain short-horned lizard	*P.d. hernandezii*	●	●
Roundtail horned lizard	*Phrynosoma modestum*	●	
Twin-spotted spiny lizard	*Sceloporus magister bimaculosus*	●	
Crevice spiny lizard	*Sceloporus poinsettii poinsettii*		●
Southern prairie lizard	*Sceloporus undulatus consobrinus*	●	
Tree lizard	*Urosaurus ornatus*		
Lined tree lizard	*U. o. linearis*	●	
Big bend tree lizard	*U. o. schmidti*		●[a]
Northern tree lizard	*U. o. wrighti*		●[a]

Table D.3-1. Amphibians and Reptiles that Occur and Could Occur on McGregor Range, Otero County, New Mexico (Continued)

Species		*Occurrence on McGregor Range*	
Common Name	*Scientific Name*	*Known*	*Possible*
Desert side-blotched lizard	*Uta stansburiana stejnegeri*	●	
Kansas glossy snake	*Arizona elegans elegans*	●	
Trans-Pecos rat snake	*Bogertophis subocularis*		●
Mexican racer	*Coluber constrictor oaxaca*		●
Western diamondback rattlesnake	*Crotalus atrox*	●	
Rock rattlesnake Banded rock rattlesnake Mottled rock rattlesnake	*Crotalus lepidus* *C. l. klauberi* *C. l. lepidus*	● 	 ●[a]
Blacktail rattlesnake	*Crotalus molossus molossus*		●
Mojave rattlesnake	*Crotalus scutulatus*	●	
Prairie rattlesnake	*Crotalus viridis viridis*	●	
Regal ringneck snake	*Diadophis punctatus regalis*	●	
Great Plains rat snake	*Elaphe gutatta emoryi*		●
Western hooknose snake	*Gyalopion canum*	●	
Hognose snake Mexican hognose snake Plains hognose snake	*Heterodon nasicus* *H. n. kennerlyi* *H. n. nasicus*	 	 ● ●
Texas night snake	*Hypsiglena torquata jani*	●	
Gray-banded kingsnake	*Lampropeltis alterna*		●
Desert kingsnake	*Lampropeltis getula splendida*	●	
New Mexico milksnake	*Lampropeltis triangulum celaenops*		●
New Mexico blind snake	*Leptotyphlops dulcis dissectus*	●	
Trans-Pecos blind snake	*Leptotyphlops humilis segregus*		●
Western coachwhip	*Masticophis flagellum testaceus*	●	
Striped whipsnake	*Masticophis taeniatus*	●	
Gopher snake Sonoran gopher snake Bullsnake	*Pituophis catenifer* *P. c. affinis* *P. c. sayi*	 ● ●	
Texas longnose snake	*Rhinocheilus lecontei tessellatus*	●	
Big bend patchnose snake	*Salvadora deserticola*		●
Mountain patchnose snake	*Salvadora grahamiae grahamiae*	●	
Desert massasauga	*Sistrurus catenatus edwardsii*		●
Ground snake	*Sonora semiannulata*	●	
Southwestern blackhead snake	*Tantilla hobartsmithi*		●
Plains blackhead snake	*Tantilla nigriceps*	●	
Western blackneck garter snake	*Thamnophis cyrtopsis cyrtopsis*		●
Checkered garter snake	*Thamnophis marcianus marcianus*		●
New Mexico garter snake	*Thamnophis sirtalis dorsalis*		●
Texas lyre snake	*Trimorphodon biscutatus vilkinsonii*	●	
Total species		*47*[b]	*19*[b]

[a] Not included in total because species is already included in Known Column.
[b] Total includes only the number of species.
Source: U.S. Army 1996e, g; 1997d, e.

multiplicata), and Couch's spadefoot (*Scaphiopus couchii)* were observed at stock tanks on Otero Mesa (U.S. Army, 1997d). A few red-spotted toads (*Bufo punctatus)* were also observed on the Otero Mesa (U.S. Army, 1997d); this species has also been observed in the desert shrub habitat of the Tularosa Basin (U.S. Army, 1996e). Sampling at 20 sites in the Chihuahuan Desert in the Tularosa Basin on McGregor Range (Figure D.3-1) resulted in the capture of 428 toads and the New Mexico spadefoot was the most common with 278 captures (65 percent of total) followed Couch's spadefoot with 103 captures (24 percent). All but one of the New Mexico spadefoot were from one sampling location while the Couch's spadefoot was much more widespread being captured at all 20 sampling sites. The Great Plains toad and western green toad (*Bufo delilis)* were each captured 18 times (4 percent) and occurred at over one-half of the sample locations. The red-spotted toad and plains spadefoot (*Spea bombifrons)* were captured infrequently (5 and 2 times respectively) (U.S. Army, 1996e).

The box turtle (*Terrapene ornata)* is the only species of turtle observed on McGregor Range and is most common in the grassland plant communities on the Otero Mesa although it has been regularly observed in the desert shrubland communities in the Tularosa Basin (U.S. Army, 1997d, e, 1996e, h). This species was recorded 11 times at six sampling sites (Figure D.3-1) on the Otero Mesa during baseline amphibian and reptile surveys in 1997 (U.S. Army, 1997d) (Table D.3-2). It was also recorded 11 times at 9 of 20 sample plots in the desert shrublands habitat in the Tularosa Basin (U.S. Army, 1996e).

The most diverse group of reptiles are the lizards; 20 species have been recorded from McGregor Range including 6 species of whiptails (Table D.3-1) (U.S. Army, 1997e). The largest number of lizard species occur in the grassland habitat (17 species) followed by the desert shrublands (13), Sacramento Mountains foothills (10), and Organ Mountains (6) (U.S. Army, 1997e). Some species such as the western marbled whiptail (*Cnemidophorus marmoratus)* and Texas horned lizard (*Phrynosoma cornutum*) are found in essentially all areas on McGregor Range, while others such as the leopard lizard (*Gambelia wislizenii*) have been reported only from the desert shrubland habitat and the lined tree lizard (*Urosaurus ornatus)* only in the wooded habitat of the Sacramento Mountains foothills (U.S. Army, 1997e). Eleven species of lizards were recorded 290 times and the most common species were the southern prairie lizard (*Sceloporus undulatus),* which was captured 89 times (31 percent of total lizard captures) and the northern earless lizard (*Holbrookia maculata),* which was captured 85 times (29 percent). The side-blotched lizard (*Uta stansburiana)* and spotted whiptail (*Cnemidophorus exanguis)* were each recorded only once (U.S. Army, 1997d) (Table D.3-2). The most common lizards captured in the desert shrubland habitat were the striped whiptail (5,500 captures), side-blotched lizard (3,163 captures), and marbled whiptail (845 captures) (U.S. Army, 1996e). In a study of amphibians and reptiles in eight arroyos and adjacent upland sites in the Chihuahuan Desert shrubland plant communities on McGregor Range found that there was no statistical difference in the amphibian and reptile species richness and abundance between arroyo and upland habitats. The most common species captured were the side-blotched lizard (captured 249 times), the marbled whiptail (191 captures),and the little striped whiptail (78 captures) (U.S. Army, 1996e).

Eighteen species of snakes have been recorded from McGregor Range (U.S. Army, 1997e, 1996e) (Table D.3-1). The largest number of species occur in the grassland habitat on Otero Mesa (13 species) followed by the desert shrubland and Sacramento Mountains foothills (11). Species such as the western diamondback rattlesnake (*Crotalus atrox)* and gopher snake (*Pituophis catenifer)* are common and widespread throughout Fort Bliss. Other species such as the Mojave (*C. scutulatus)* and prairie (*C. viridis)* rattlesnakes have been reported only from the grassland habitat on Otero Mesa, and the Texas long-nosed snake (*Rhinocheilus lecontei)* was observed only in the Sacramento Mountains foothills (U.S. Army, 1997e) and the desert shrubland habitat of the Tularosa Basin (U.S. Army, 1996e). Surveys on Otero Mesa in 1997 yielded seven species of snakes (Table D.3-2). The western diamondback rattlesnake and western coachwhip (*Masticophis flagellum)* were the most common species observed. Other species observed include the hook-nosed snake (*Gyalopion canum),* Kansas glossy snake (*Arizona elegans),* and

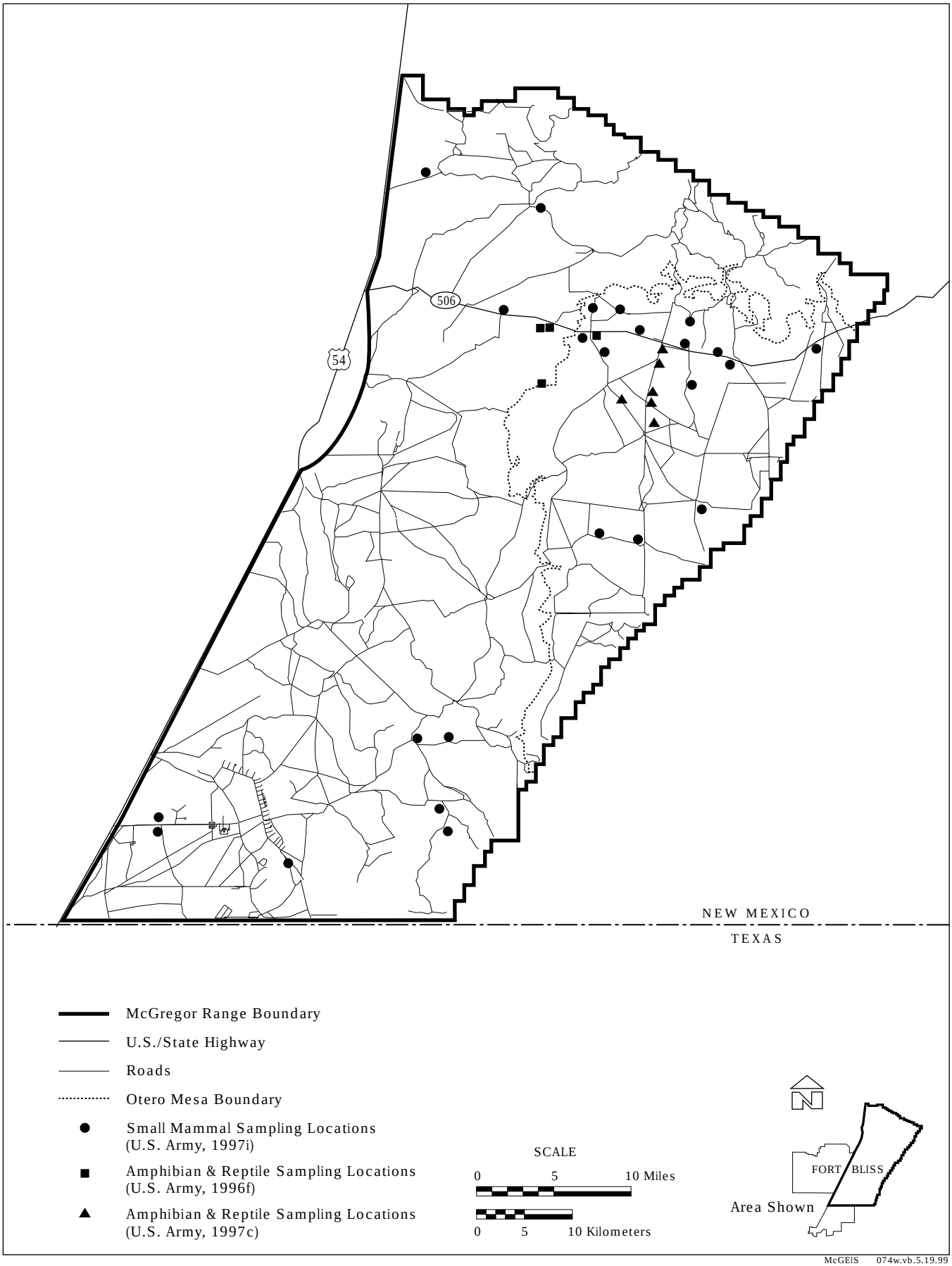

Figure D.3-1. Amphibian, Reptile and Small Mammal Sampling Locations on McGregor Range.

Table D.3-2. Amphibians and Reptiles Observed at Six Sampling Sites, Along Arroyos, Roads, and at Stock Tanks on McGregor Range in 1997

Species[a]	*Sampling Site*						*Arroyo*	*Tanks*	*Roads*	*Total*
	1	*2*	*3*	*4*	*5*	*6*				
New Mexico spadefoot	0	1	0	0	15	7	1	N[b]	0	*N(24)*[c]
Great Plains toad	0	0	0	0	0	0	0	N	0	*N*
Couch's spadefoot	0	0	0	0	0	0	0	N	1	*N(1)*[c]
Southern prairie lizard	15	1	4	41	0	22	6	0	0	*89*
Northern earless lizard	7	33	17	8	14	6	0	0	0	*85*
Striped whiptail	8	17	21	12	0	2	3	0	2	*65*
Short-horned lizard	0	10	3	0	2	1	2	0	2	*20*
Collared lizard	7	4	0	0	0	1	1	0	1	*14*
Western box turtle	0	0	0	0	1	0	0	2	8	*11*
Checkered whiptail	3	0	0	0	0	0	4	0	0	*7*
Western diamondback rattlesnake	1	0	0	0	0	0	4	0	2	*7*
Western coachwhip	0	0	0	0	0	0	2	0	3	*5*
Texas horned lizard	0	1	1	0	0	0	0	0	2	*4*
Sonoran gopher snake	0	1	0	0	0	0	0	0	2	*3*
Red-spotted toad	0	0	0	0	0	0	0	0	3	*3*
Round-tailed horned lizard	0	2	0	0	0	0	0	0	0	*2*
Hooknose snake	0	0	1	0	1	0	0	0	0	*2*
Greater earless lizard	0	0	0	0	0	0	0	0	2	*2*
Spotted whiptail	1	0	0	0	0	0	0	0	0	*1*
Kansas glossy snake	0	0	0	1	0	0	0	0	0	*1*
Side-blotched lizard	0	0	0	0	0	0	1	0	0	*1*
Prairie rattlesnake	0	0	0	0	0	0	0	0	1	*1*
Garter snake species	0	0	0	0	0	0	0	0	1	*1*
Total number of species	*7*	*9*	*6*	*4*	*5*	*6*	*9*	*4*	*13*	*23*
Total number of individuals	*42*	*70*	*47*	*62*	*33*	*39*	*24*	*2*[d]	*30*	*349*

[a] See Table D.2-1 for scientific names.
[b] "N" = numerous.
[c] Number observed at locations other than tanks.
[d] Numerous toads also observed.
Source: U.S. Army, 1997d.

prairie rattlesnake (U.S. Army, 1997d). In the desert shrubland habitat in the Tularosa Basin, the night snake (*Hypsiglena torquata*) (59 captures), plains black-headed snake (*Tantilla nigriceps)* (58 captures), and ground snake (*Sonora semiannulata*) (43 captures) were the most common. Five species were recorded fewer times including the western hook-nosed snake (18 captures), long-nosed snake (*Rhinocheilus lecontei)* (8 captures), desert kingsnake (*Lampropeltis gelula)* (3 captures), gopher snake, and western coachwhip (1 capture each) (U.S. Army, 1996e).

D.3.2 Avifauna

A total of 334 species of birds have been recorded from Fort Bliss (U.S. Army, 1996h) and 223 of these have been recorded from McGregor Range (Table D.3-3). Sixty-three of the species not recorded from McGregor Range were diving birds, wading birds, waterfowl, shorebirds, gulls, and terns that use aquatic habitats; appropriate aquatic habitat for these species either does not exist or is rare on McGregor Range. Many of these aquatic and wetlands species have been observed at the sewage lagoons and oxidation

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County, Texas

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Common loon	*Gavia immer*					●
Pied-billed grebe[b]	*Podilymbus podiceps*			●		
Horned grebe	*Podiceps auritus*					●
Eared grebe	*Podiceps nigricollis*			●		
Western grebe	*Aechmophorus occidentalis*				●	
Clark's grebe	*Aechmophorus clarkii*					●
American white pelican	*Pelecanus erythrorhynchus*					●
Double-crested cormorant	*Phalacrocorax auritus*				●	
Neotropic cormorant	*Phalacrocorax brasilianus*				●	
Least bittern	*Ixobrychus exilis*					●
Great blue heron[b]	*Ardea herodias*			●		
Great egret[b]	*Ardea alba*				●	
Snowy egret[b]	*Egretta thula*				●	
Little blue heron	*Egretta caerulea*					●
Reddish egret	*Egretta rufescens*					●
Cattle egret[b]	*Bubulcus ibis*				●	
Green heron[b]	*Butorides virescens*				●	
Black-crowned night-heron	*Nycticorax nycticorax*				●	
Yellow-crowned night-heron	*Nyctanass violacea*					●
Glossy ibis	*Plegadis falcinellus*					●
White-faced ibis	*Plegadis chihi*			●		
Turkey vulture[b]	*Cathartes aura*		●			
Greater white-fronted goose	*Anser albifrons*					●
Snow goose[b]	*Chen caerulescens*			●		
Ross's goose	*Chen rossii*					●
Canada goose	*Branta canadensis*					●
Wood duck	*Aix sponsa*				●	
Gadwall[b]	*Anas strepera*			●		
Eurasian wigeon	*Anas penelope*					●
American wigeon[b]	*Anas americana*			●		
Mallard[b]	*Anas platyrhynchos*			●		
Blue-winged teal[b]	*Anas discors*			●		
Cinnamon teal[b]	*Anas cyanoptera*			●		
Northern shoveler[b]	*Anas clypeata*		●			
Northern pintail[b]	*Anas acuta*			●		
Green-winged teal[b]	*Anas crecca*		●			
Canvasback[b]	*Aythya valisineria*			●		
Redhead[b]	*Aythya americana*			●		
Ring-necked duck[b]	*Aythya collaris*			●		
Greater scaup	*Aythya marila*					●
Lesser scaup[b]	*Aythya affinis*			●		
Surf scoter	*Melanitta perspicillata*					●
White-winged scoter	*Melanitta fusca*					●
Bufflehead[b]	*Bucephala albeola*				●	
Common goldeneye	*Bucephala clangula*				●	
Hooded merganser	*Lophodytes cucullatus*					●
Common merganser	*Mergus merganser*				●	
Red-breasted merganser	*Mergus serrator*					●
Masked duck	*Nomonyx dominicus*					●
Ruddy duck[b]	*Oxyura jamaicensis*			●		
Osprey[b]	*Pandion haliaetus*			●		

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
White-tailed kite[b]	*Elanus leucurus*					●
Mississippi kite[b]	*Ictinia mississippiensis*					●
Bald eagle[b]	*Haliaeetus leucocephalus*				●	
Northern harrier[b]	*Circus cyaneus*			●		
Sharp-shinned hawk[b]	*Accipiter striatus*				●	
Cooper's hawk[b]	*Accipiter cooperii*			●		
Northern goshawk[b]	*Accipiter gentilis*					●
Gray hawk	*Asturina nitidus*					●
Common black-hawk	*Buteogallus anthracinus*					●
Harris's hawk[b]	*Parabuteo unicinctus*					●
Swainson's hawk[b]	*Buteo swainsoni*		●			
Red-tailed hawk[b]	*Buteo jamaicensis*		●			
Rough-legged hawk[b]	*Buteo lagopus*					●
Ferruginous hawk[b]	*Buteo regalis*			●		
Zone-tailed hawk[b]	*Buteo albonotatus*					●
Golden eagle[b]	*Aquila chrysaetos*			●		
American kestrel[b]	*Falco sparverius*		●			
Merlin[b]	*Falco columbarius*					●
Prairie falcon[b]	*Falco mexicanus*				●	
Peregrine falcon[b]	*Falco peregrinus*					●
Wild turkey[b]	*Meleagris gallopavo*				●	
Montezuma quail[b]	*Cyrtonyx montezumae*				●	
Scaled quail[b]	*Callipepla squamata*		●			
Gambel's quail[b]	*Callipepla gambelii*		●			
Virginia rail	*Rallus limicola*					●
Sora	*Porzana carolina*					●
Common moorhen	*Gallinula chloropus*					●
American coot[b]	*Fulica americana*			●		
Sandhill crane[b]	*Grus canadensis*				●	
Black-bellied plover	*Pluvialis squatarola*					●
American golden-plover	*Pluvialis dominica*					●
Snowy plover	*Charadrius alexandrinus*				●	
Semipalmated plover	*Charadrius semipalmatus*				●	
Piping plover	*Charadrius melodus*					●
Killdeer[b]	*Charadrius vociferus*		●			
Black-necked stilt	*Himantopus mexicanus*				●	
American avocet[b]	*Recurvirostra americana*				●	
Greater yellowlegs[b]	*Tringa melanoleuca*				●	
Lesser yellowlegs[b]	*Tringa flavipes*				●	
Solitary sandpiper[b]	*Tringa solitaria*				●	
Willet[b]	*Catoptrophorus semipalmatus*				●	
Spotted sandpiper[b]	*Actitis macularia*				●	
Upland sandpiper[b]	*Bartramia longicauda*					●
Whimbrel	*Numenius phaeopus*					●
Long-billed curlew[b]	*Numenius americanus*					●
Marbled godwit	*Limosa fedoa*					●
Ruddy turnstone	*Arenaria interpres*					●
Red knot	*Calidris canutus*					●
Sanderling	*Calidris alba*					●
Semipalmated sandpiper	*Calidris pusilla*					●
Western sandpiper[b]	*Calidris mauri*			●		

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County, Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Least sandpiper[b]	*Calidris minutilla*			●		
White-rumped sandpiper	*Calidris fuscicollis*					●
Baird's sandpiper	*Calidris bairdii*			●		
Pectoral sandpiper	*Calidris melanotos*				●	
Dunlin	*Calidris alpina*					●
Stilt sandpiper	*Calidris himantopus*				●	
Ruff	*Philomachus pugnax*					●
Short-billed dowitcher	*Limnodromus griseus*					●
Long-billed dowitcher	*Limnodromus scolopaceus*			●		
Common snipe[b]	*Gallinago gallinago*			●		
Wilson's phalarope[b]	*Phalaropus tricolor*			●		
Red-necked phalarope	*Phalaropus lobatus*			●		
Red phalarope	*Phalaropus fulicarius*					●
Laughing gull	*Larus atricilla*					●
Franklin's gull	*Larus pipixcan*					●
Bonaparte's gull[b]	*Larus philadelphia*				●	
Ring-billed gull[b]	*Larus delawarensis*				●	
California gull	*Larus californicus*					●
Herring gull	*Larus argentatus*					●
Western gull	*Larus occidentalis*					●
Sabine's gull	*Xema sabini*					●
Caspian tern	*Sterna caspia*					●
Common tern	*Sterna hirundo*					●
Forster's tern	*Sterna forsteri*				●	
Black tern	*Chlidonias niger*				●	
Rock dove[b]	*Columba livia*		●			
Band-tailed pigeon	*Columba fasciata*					●
White-winged dove[b]	*Zenaida asiatica*			●		
Mourning dove[b]	*Zenaida macroura*		●			
Inca dove[b]	*Columbina inca*					●
Yellow-billed cuckoo[b]	*Coccyzus americanus*				●	
Greater roadrunner[b]	*Geococcyx californicus*			●		
Groove-billed ani	*Crotophaga sulcirostris*					●
Barn owl[b]	*Tyto alba*				●	
Western screech-owl[b]	*Otus kennicotti*				●	
Great horned owl[b]	*Bubo virginianus*			●		
Northern pygmy-owl[b]	*Glaucidium gnoma*					●
Burrowing owl[b]	*Athene cunicularia*			●		
Spotted owl[b]	*Strix occidentalis*					●
Long-eared owl[b]	*Asio otus*				●	
Short-eared owl[b]	*Asio flammeus*					●
Lesser nighthawk[b]	*Chordeiles acutipennis*			●		
Common nighthawk[b]	*Chordeiles minor*				●	
Common poorwill[b]	*Phalaenoptila nuttallii*			●		
Whip-poor-will[b]	*Caprimulgus vociferus*					●
Black swift[b]	*Cypseloides niger*					●
White-throated swift[b]	*Aeronautes saxatilis*			●		
Black-chinned hummingbird[b]	*Archilochus alexandrinus*		●			
Costa's hummingbird	*Calypte costae*					●
Calliope hummingbird[b]	*Stellula calliope*					●

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County, Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Broad-tailed hummingbird[b]	*Selasphorus platycercus*				●	
Rufous hummingbird[b]	*Selasphorus rufus*				●	
Belted kingfisher	*Ceryle alcyon*					●
Lewis' woodpecker	*Melanerpes lewis*					●
Acorn woodpecker[b]	*Melanerpes formicivorus*					●
Yellow-bellied sapsucker	*Sphyrapicus varius*					●
Red-naped sapsucker[b]	*Sphyrapicus nuchalis*				●	
Williamson's sapsucker[b]	*Sphyrapicus thyroideus*					●
Ladder-backed woodpecker[b]	*Picoides scalaris*			●		
Downy woodpecker	*Picoides pubescens*					●
Hairy woodpecker[b]	*Picoides villosus*				●	
Northern flicker[b]	*Colaptes auratus*				●	
Olive-sided flycatcher[b]	*Contopus cooperi*					●
Western wood-pewee[b]	*Contopus sordidulus*				●	
Willow flycatcher[b]	*Empidonax traillii*					●
Least flycatcher	*Empidonax minimus*					●
Hammond's flycatcher[b]	*Empidonax hammondii*					●
Dusky flycatcher[b]	*Empidonax oberholseri*			●		
Gray flycatcher[b]	*Empidonax wrightii*					●
Cordilleran flycatcher[b]	*Empidonax occidentalis*				●	
Black phoebe[b]	*Sayornis nigricans*			●		
Eastern phoebe	*Sayornis phoebe*					●
Say's phoebe[b]	*Sayornis saya*			●		
Ash-throated flycatcher[b]	*Myiarchus cinerascens*			●		
Cassin's kingbird[b]	*Tyrannus vociferans*					●
Western kingbird[b]	*Tyrannus verticalis*		●			
Eastern kingbird	*Tyrannus tyrannus*					●
Northern shrike[b]	*Lanius excubitor*					●
Loggerhead shrike[b]	*Lanius ludovicianus*		●			
Bell's vireo[b]	*Vireo bellii*					●
Gray vireo[b]	*Vireo vicinior*				●	
Hutton's vireo	*Vireo huttoni*					●
Warbling vireo[b]	*Vireo gilvus*					●
Philadelphia vireo	*Vireo philadelphicus*					●
Red-eyed vireo	*Vireo olivaceus*					●
Cassin's vireo[b]	*Vireo cassinii*			●		
Plumbeous vireo[b]	*Vireo plumbeus*					●
Steller's jay[b]	*Cyanocitta stelleri*					●
Western scrub-jay[b]	*Aphelocoma californica*				●	
Pinyon jay[b]	*Gymnorhinus cyanocephalus*				●	
American crow[b]	*Corvus brachyrhynchos*					●
Chihuahuan raven[b]	*Corvus cryptoleucus*			●		
Common raven[b]	*Corvus corax*				●	
Horned lark[b]	*Eremophila alpestris*		●			
Purple martin[b]	*Progne subis*					●
Tree swallow[b]	*Tachycineta bicolor*					●
Violet-green swallow[b]	*Tachycineta thalassina*				●	
Northern rough-winged swallow[b]	*Stelgidopteryx serripennis*			●		
Bank swallow[b]	*Riparia riparia*			●		
Barn swallow[b]	*Hirundo rustica*		●			
Cliff swallow[b]	*Petrochelidon pyrrhonota*			●		

Table D.3-3. Birds Observed on Fort Bliss Otero and Doña Ana Counties, New Mexico, and El Paso County Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Cave swallow	*Petrochelidon fulva*					●
Mountain chickadee[b]	*Poecile gambeli*				●	
Juniper titmouse[b]	*Baeolophus ridgwayi*				●	
Verdin[b]	*Auriparus flaviceps*			●		
Bushtit[b]	*Psaltriparus minimus*				●	
Red-breasted nuthatch	*Sitta canadensis*			●		
White-breasted nuthatch[b]	*Sitta carolinensis*			●		
Pygmy nuthatch	*Sitta pygmaea*					●
Brown creeper[b]	*Certhia americana*					●
Cactus wren[b]	*Campylorhynchus brunneicapillus*			●		
Rock wren[b]	*Salpinctes obsoletus*		●			
Canyon wren[b]	*Catherpes mexicanus*			●		
Bewick's wren[b]	*Thryomanes bewickii*		●			
House wren[b]	*Troglodytes aedon*				●	
Marsh wren	*Cistothorus palustris*					●
American dipper	*Cinclus mexicanus*					●
Golden-crowned kinglet[b]	*Regulus satrapa*				●	
Ruby-crowned kinglet[b]	*Regulus calendula*			●		
Black-tailed gnatcatcher[b]	*Polioptila melanura*		●			
Blue-gray gnatcatcher[b]	*Polioptila caerulea*			●		
Eastern bluebird[b]	*Sialia sialis*					●
Western bluebird[b]	*Sialia mexicana*			●		
Mountain bluebird[b]	*Sialia currucoides*		●			
Townsend's solitaire[b]	*Myadestes townsendi*			●		
Swainson's thrush[b]	*Catharus ustulatus*					●
Hermit thrush[b]	*Catharus guttatus*			●		
American robin[b]	*Turdus migratorius*			●		
Northern mockingbird[b]	*Mimus polyglottos*		●			
Sage thrasher[b]	*Oreoscoptes montanus*				●	
Brown thrasher	*Toxostoma rufum*					●
Curve-billed thrasher[b]	*Toxostoma curvirostre*				●	
Crissal thrasher[b]	*Toxostoma dorsalis*			●		
European starling[b]	*Sturnus vulgaris*			●		
American pipit[b]	*Anthus rubescens*			●		
Sprague's pipit[b]	*Anthus spraguei*				●	
Cedar waxwing[b]	*Bombycilla cedrorum*			●		
Phainopepla[b]	*Phainopepla nitens*				●	
Golden-winged warbler	*Vermivora chrysoptera*					●
Tennessee warbler	*Vermivora peregrina*					●
Orange-crowned warbler[b]	*Vermivora celata*			●		
Nashville warbler	*Vermivora ruficapilla*					●
Virginia's warbler[b]	*Vermivora virginiae*				●	
Lucy's warbler[b]	*Vermivora luciae*					●
Northern parula	*Parula americana*					●
Yellow warbler[b]	*Dendroica petechia*				●	
Chestnut-sided warbler[b]	*Dendroica pensylvanica*					●
Yellow-rumped warbler[b]	*Dendroica coronata*			●		
Black-throated gray warbler[b]	*Dendroica nigrescens*				●	
Townsend's warbler[b]	*Dendroica townsendi*				●	
Hermit warbler	*Dendroica occidentalis*					●
Black-throated green warbler	*Dendroica virens*					●

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Blackburnian warbler	*Dendroica fusca*					●
Grace's warbler[b]	*Dendroica graciae*					●
Palm warbler	*Dendroica palmarum*					●
Red-faced warbler	*Cardellina rubrifrons*					●
Blackpoll warbler	*Dendroica striata*					●
Black-and-white warbler	*Mniotilta varia*					●
Painted redstart	*Myioborus pictus*					●
American redstart	*Setophaga ruticilla*					●
Prothonotary warbler	*Protonotaria citrea*					●
Northern waterthrush	*Seiurus noveboracensis*			●		
MacGillivray's warbler[b]	*Oporornis tolmei*			●		
Common yellowthroat[b]	*Geothlypis trichas*			●		
Hooded warbler[b]	*Wilsonia citrina*					●
Wilson's warbler[b]	*Wilsonia pusilla*		●			
Yellow-breasted chat	*Icteria virens*					●
Hepatic tanager[b]	*Piranga flava*				●	
Summer tanager[b]	*Piranga rubra*					●
Western tanager[b]	*Piranga ludoviciana*				●	
Green-tailed towhee[b]	*Pipilo chlorurus*			●		
Eastern towhee[b]	*Pipilo erythrophthalmus*					●
Spotted towhee[b]	*Pipilo maculatus*			●		
Canyon towhee[b]	*Pipilo fuscus*		●			
Cassin's sparrow[b]	*Aimophila cassinii*				●	
Rufous-crowned sparrow[b]	*Aimophila ruficeps*		●			
Chipping sparrow[b]	*Spizella passerina*			●		
Clay-colored sparrow[b]	*Spizella pallida*			●		
Brewer's sparrow[b]	*Spizella breweri*			●		
Black-chinned sparrow[b]	*Spizella atrogularis*				●	
Vesper sparrow[b]	*Pooecetes gramineus*			●		
Lark sparrow[b]	*Chondestes grammacus*			●		
Black-throated sparrow[b]	*Amphispiza bilineata*		●			
Sage sparrow[b]	*Amphispiza belli*				●	
Lark bunting[b]	*Calamospiza melanocorys*			●		
Savannah sparrow[b]	*Passerculus sandwichensis*			●		
Baird's sparrow[b]	*Ammodramus bairdii*				●	
Grasshopper sparrow[b]	*Ammodramus savannarum*					●
Fox sparrow	*Passerella iliaca*					●
Song sparrow[b]	*Melospiza melodia*			●		
Lincoln's sparrow[b]	*Melospiza lincolnii*			●		
Swamp sparrow	*Melospiza georgiana*				●	
White-throated sparrow[b]	*Zonotrichia albicollis*					●
Harris's sparrow[b]	*Zonotrichia querula*					●
White-crowned sparrow[b]	*Zonotrichia leucophrys*		●			
Dark-eyed junco[b]	*Junco hyemalis*		●			
McCown's longspur[b]	*Calcarius mccownii*					●
Lapland longspur	*Calcarius lapponicus*					●
Chestnut-collared longspur[b]	*Calcarius ornatus*		●			
Pyrrhuloxia[b]	*Cardinalis sinuatus*			●		
Rose-breasted grosbeak[b]	*Pheucticus ludovicianus*					●
Black-headed grosbeak[b]	*Pheucticus melanocephalus*			●		
Blue grosbeak[b]	*Guiraca caerulea*			●		

Table D.3-3. Birds Observed on Fort Bliss, Otero and Doña Ana Counties, New Mexico, and El Paso County Texas (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Lazuli bunting[b]	*Passerina amoena*			●		
Indigo bunting	*Passerina cyanea*					●
Varied bunting[b]	*Passerina versicolor*					●
Painted bunting	*Passerina ciris*					●
Dickcissel[b]	*Spiza americana*				●	
Bobolink	*Dolichonyx oryzivorus*					●
Red-winged blackbird[b]	*Agelaius phoeniceus*			●		
Eastern meadowlark[b]	*Sturnella magna*		●			
Western meadowlark[b]	*Sturnella neglecta*			●		
Yellow-headed blackbird[b]	*Xanthocephalus xanthocephalus*			●		
Rusty blackbird	*Euphagus carolinus*					●
Brewer's blackbird[b]	*Euphagus cyanocephalus*			●		
Great-tailed grackle[b]	*Quiscalus mexicanus*			●		
Bronzed cowbird	*Molothus aeneus*					●
Brown-headed cowbird[b]	*Molothrus ater*			●		
Hooded oriole	*Icterus cucullatus*					●
Baltimore oriole	*Icterus galbula*					●
Bullock's oriole[b]	*Icterus bullockii*			●		
Scott's oriole[b]	*Icterus parisorum*		●			
Purple finch[b]	*Carpodacus purpureus*					●
House finch[b]	*Carpodacus mexicanus*		●			
Cassin's finch[b]	*Carpodacus cassini*					●
Pine siskin[b]	*Carduelis pinus*			●		
Red crossbill[b]	*Loxia curvirostra*					●
Lawrence's goldfinch	*Carduelis lawrencei*					●
American goldfinch[b]	*Carduelis tristis*					●
Lesser goldfinch[b]	*Carduelis psaltria*				●	
House sparrow[b]	*Passer domesticus*		●			
Evening grosbeak[b]	*Coccothraustes vespertinus*					●
Total		*0*	*32*	*89*	*72*	*141*

[a] A = abundant, C = common, FC = fairly common, UC = uncommon, R = rare.
[b] Species recorded from McGregor Range.
The most abundant category is chosen for each species. For example, if a species is common in the summer but rare in the winter, it is given a "C" delineation on this table.
Source: U.S. Army, 1996f, g, h, 1997f, g, j, 1998k.

ponds near the Fort Bliss cantonment area in Texas. Another 16 species not recorded on McGregor Range were warblers that are rare to very rare migrants on Fort Bliss. These species may not occur on McGregor Range, but have been observed elsewhere on Fort Bliss due to more observers in the cantonment area and at the sewage lagoons and oxidation ponds.

In recent years, detailed studies of the bird life in various habitats on McGregor Range were conducted and some of these studies are still in progress. These studies have centered on determining existing conditions and have concentrated on documenting breeding bird communities in various habitats, the occurrence of neotropical migrants, and the status of sensitive species. This section discusses the results of the breeding bird, neotropical migrant, and raptor studies, while sensitive species are addressed in Section D.4. Breeding bird surveys have been conducted in numerous locations scattered throughout McGregor Range (Figure D.3-2) and the results of these studies are summarized below.

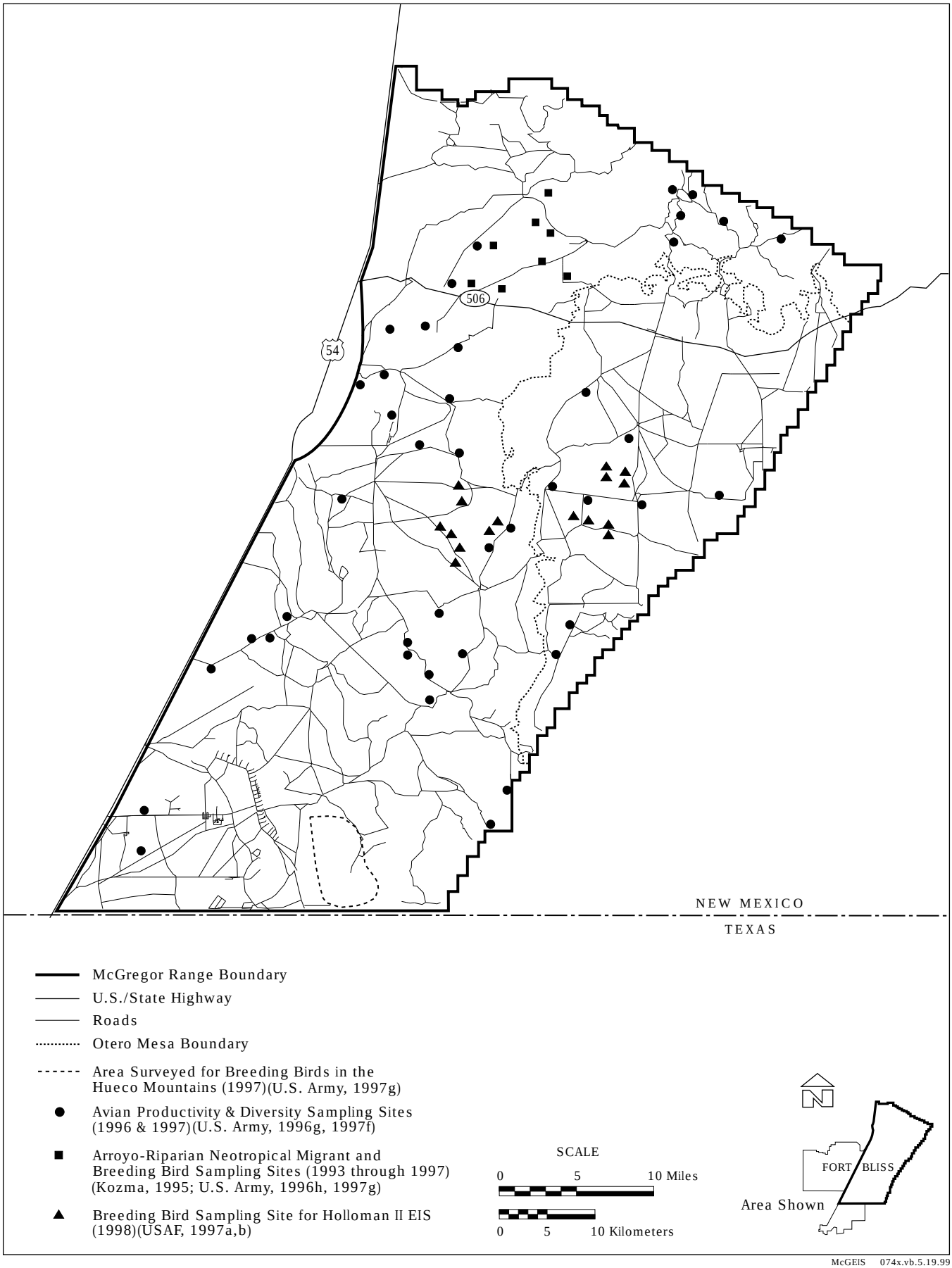

Figure D.3-2. Breeding Bird Survey Locations on McGregor Range.

Tularosa Basin

Breeding birds. In 1996 and 1997, 24 sites were sampled for breeding birds in the Tularosa Basin on McGregor Range in desert shrub habitats dominated by sandsage (*Artemisia filifolia)*, mesquite, creosote, and viscid acacia (*Acacia noevernicosa)* (U.S. Army, 1996g, 1997f). The total number of birds recorded at these four habitats increased 1.7 times from 6,092 in 1996 to 10,077 in 1997 (Table D.3-4). The number of species decreased from 75 in 1996 to 70 in 1997. Overall, 83 species have been recorded from these four habitats over the 2-year period. In 1996, the mesquite habitat had the largest number of species (53) and individuals (1,943) and the creosotebush habitat the least number of species (46) and individuals (1,337). In 1997, the viscid acacia habitat had the largest number of species (47) and individuals (2,743), while the creosotebush habitat had the least species (44) and the sandsage habitat the least number of individuals (2,315). The black-throated sparrow (*Amphispiza bilineata)* was by far the most common species recorded in all four habitats both years (2,372 in 1996 and 3,213 in 1997). In 1996, it ranged from 29 percent of the birds in the viscid acacia habitat to 44 percent of the birds in the sandsage habitat and 28 percent of the birds in the creosote and acacia habitat to 39 percent of the birds in the sandsage habitat in 1997. Other common species were the Scott's oriole (*Icterus parisorum)*, western kingbird (*Tyrannus verticalis)*, ash-throated flycatcher (*Myiarchus cinerascens)*, mourning dove (*Zenaida macroura)*, northern mockingbird (*Mimus polyglottes)*, pyrrhuloxia (*Cardinalis sinuatus)*, cactus wren (*Campylorhynchus brunneicapillus)*, house finch (*Carpodacus mexicanus)*, and verdin (*Auriparus flaviceps).* All these species showed substantial increases ranging from 1.3 to 2.4 times more birds in 1997 then 1996. Cassin's sparrow showed the greatest increase form 23 birds in 1996 to 380 in 1997 or 16.5 times more birds in 1997; most of this increase took place in the creosote habitat (Table D.3-4).

In 1997, 718 nests of 43 species were observed compared to 453 nests of 34 species in 1996 (U.S. Army, 1996g, 1997f). In the desert shrublands habitats, the largest number of nests found were for the black-throated sparrow followed by the western kingbird, cactus wren, and crissal thrasher (*Toxostoma dorsalis*). During both years, the greatest number of nests were found in the mesquite habitat; this habitat had almost twice as many nests as the next most abundant habitat in 1996 and 1.5 times more in 1997.

Breeding bird studies at eight sample locations in arroyo-riparian habitat and surrounding uplands in the Chihuahuan Desert biome have shown that black-throated sparrow, northern mockingbird, verdin, brown-headed cowbird *(Molothrus ater)*, mourning dove, and ash-throated flycatcher are the most common species. During 4 out of 5 years of this study, more species were detected in arroyos than uplands. Of the common species, the black-throated sparrow and Scott's oriole were detected more frequently in the uplands while the remaining species were detected more frequently in the arroyos. Data collected in 1996 showed that slightly more species were detected in the uplands than in the arroyos (U.S. Army, 1995c, 1996h, 1997g; Kozma, 1995). A total of 1,214 nests of 32 species were detected from 1993 through 1997 and nests of the black-throated sparrow, northern mockingbird, Scott's oriole, mourning dove, crissal thrasher, and house finch were most commonly encountered. Approximately twice as many nest were detected in 1997 than the other survey years and this may have been due to above average precipitation in 1996 and 1997 (Myers and Mathews, 1997). Rock wrens (*Salpinctes obsoletus)*, verdins and canyon towhees (*Pipilo fuscus*) nested most frequently in arroyos while black-throated sparrows, northern mockingbirds, and Scott's oriole nested more frequently in uplands. Nest density was about twice as high in arroyo habitat and Torrey yucca, javelina bush (*Condalia warnockii)*, and little-leaf sumac were most frequently used for nesting even though these shrubs were among the lowest in density (Kozma and Mathews, 1997).

Breeding bird surveys were conducted along transects at four arroyo/upland sites (a total of eight transects) in the Chihuahuan Desert below the Otero Mesa escarpment in 1997 (USAF, 1997a, b). A total of 40 species of birds comprising 689 individuals were recorded (Table D.3-5). For the combined

Table D.3-4. Number of Birds Observed in 24 Study Plots in Four Desert Shrublands Habitat Types on McGregor Range, Otero County, New Mexico

Species	*Plant Community Type*							
	Sandsage		*Mesquite*		*Creosote*		*Viscid acacia*	
	1996	*1997*	*1996*	*1997*	*1996*	*1997*	*1996*	*1997*
Black-throated sparrow	599	900	827	832	529	708	417	773
Western kingbird	106	215	159	206	47	81	48	56
Scott's oriole	84	185	118	142	91	152	128	157
Mourning dove	72	128	83	65	34	203	69	223
Northern mockingbird	45	29	64	40	43	48	102	388
Pyrrhuloxia	44	129	108	264	25	40	1	4
Cactus wren	40	139	74	169	62	171	61	87
Ash-throated flycatcher	33	125	85	100	82	118	126	146
Crissal thrasher	31	61	37	77	2	19	9	18
Brewers sparrow	28	26	9	52	3	53	6	7
House finch	27	18	39	34	45	48	91	163
Loggerhead shrike	21	51	7	8	17	17	9	7
Chihuahuan raven	17	57	9	26	28	38	0	2
Verdin	16	46	41	95	48	62	78	155
Scaled quail	14	61	15	51	8	79	14	133
Swainson's hawk	10	9	6	9	6	3	1	0
Green-tailed towhee	9	3	13	2	3	3	2	36
Black-tailed gnatcatcher	7	23	38	97	9	6	16	35
Brown-headed cowbird	7	16	41	108	13	30	36	86
Turkey vulture	7	11	1	6	2	6	9	13
Barn swallow	6	0	2	0	5	0	0	0
Cliff swallow	6	2	0	0	4	0	1	0
Eastern meadowlark	5	7	0	1	26	81	18	20
Bullock's oriole	5	5	4	2	0	5	0	0
Gambel's quail	5	9	15	13	4	11	4	7
Blue grosbeak	4	9	7	14	22	39	13	11
Lark bunting	4	0	0	0	0	0	0	3
Blue-gray gnatcatcher	3	0	3	5	0	1	0	0
Cassin's sparrow	3	3	0	0	20	353	0	24
Northern rough-winged swallow	3	2	0	0	0	0	0	0
Common nighthawk	2	3	4	6	36	64	63	81
Greater roadrunner	2	2	6	0	1	8	0	9
Lesser nighthawk	2	3	9	13	13	32	8	5
Pine siskin	2	0	2	2	0	1	0	0
Audubon's warbler	2	2	6	9	0	2	0	0
Black-chinned hummingbird	1	0	1	0	0	1	1	0
Burrowing owl	1	0	0	0	0	0	0	0
Cassin's' kingbird	1	0	0	0	2	0	1	0
Common poorwill	1	0	2	2	0	1	0	0
Curved billed thrasher	1	1	3	21	2	2	3	12
House wren	1	0	0	0	0	0	0	3
MacGillivray's warbler	1	0	3	3	0	0	0	0
Northern flicker	1	0	1	4	0	0	0	0
Northern harrier	1	1	1	0	0	1	0	0
Red-tailed hawk	1	1	5	3	0	2	1	1
Say's phoebe	1	4	3	1	1	1	1	2
Cassin's vireo	1	1	0	0	0	1	0	0

Table D.3-4. Number of Birds Observed in 24 Study Plots in Four Desert Shrublands Habitat Types on McGregor Range, Otero County, New Mexico (Continued)

Species	*Plant CommunityType*							
	Sandsage		*Mesquite*		*Creosote*		*Viscid acacia*	
	1996	*1997*	*1996*	*1997*	*1996*	*1997*	*1996*	*1997*
Song sparrow	1	0	2	0	0	0	0	0
Spotted towhee	1	0	3	0	1	0	1	1
Western flycatcher	1	0	3	0	0	0	0	0
Ladder-backed woodpecker	0	6	10	14	0	1	5	1
Brewer's blackbird	0	0	8	1	3	0	13	0
Vesper sparrow	0	0	4	0	0	0	0	0
Chipping sparrow	0	7	2	1	0	0	2	6
Western tanager	0	0	2	2	1	0	0	0
Lark sparrow	0	0	2	0	0	0	2	6
Bewick's wren	0	1	1	0	0	0	0	10
Wilson's warbler	0	2	2	3	0	0	2	1
Black-throated gray warbler	0	0	1	0	0	0	0	0
Orange crowned warbler	0	0	1	0	0	0	1	0
Western bluebird	0	0	1	0	0	0	2	0
Prairie falcon	0	0	1	0	0	0	0	0
White-crowned sparrow	0	0	0	2	8	0	0	0
American kestrel	0	0	0	1	1	0	5	4
White-throated swift	0	0	0	0	2	0	0	0
Hermit thrush	0	0	0	0	1	0	0	1
Horned lark	0	1	0	0	1	4	1	0
Virginia's warbler	0	0	0	0	1	0	0	0
Canyon towhee	0	0	0	0	0	1	8	11
Rufous-crowned sparrow	0	0	0	0	0	0	2	14
White-winged dove	0	0	0	0	0	0	2	2
Black-headed grosbeak	0	0	0	0	0	0	1	0
Great horned owl	0	1	0	0	0	0	1	0
Rock wren	0	0	0	0	0	0	1	5
Western meadowlark	0	0	0	0	0	0	1	2
Common raven	0	3	0	0	0	0	0	0
Western wood-pewee	0	0	0	0	0	0	0	10
Golden eagle	0	0	0	0	0	1	0	0
Sharp-shinned hawk	0	0	0	0	0	0	0	1
Broad-tailed hummingbird	0	7	0	5	0	3	0	1
Common yellow-throat	0	0	0	2	0	1	0	0
Ruby-crowned kinglet	0	0	0	1	0	0	0	0
Lesser goldfinch	0	0	0	3	0	0	0	0
Unidentified bird	77	0	49	0	85	0	62	0
Locations sampled	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Number of species	*50*	*44*	*53*	*46*	*46*	*44*	*47*	*47*
Number of individuals	*1,363*	*2,315*	*1,943*	*2,517*	*1,337*	*2,502*	*1,449*	*2,743*

Source: U.S. Army, 1996h, 1997f.

transects, 16 percent more species and 41 percent more individuals were recorded in the arroyos than the uplands. For combined results, the black-throated sparrow accounted for 25 percent of the birds recorded followed by the northern mockingbird (8 percent), turkey vulture (8 percent), ash-throated flycatcher (7

Table D.3-5. Birds Recorded During Breeding Bird Surveys in Arroyo and Upland Habitats in the Chihuahuan Desert Plant Communities on McGregor Range, Otero County, New Mexico

Species	*Little Mack Tank*		*Middle Tank*		*Javelina Wash*		*Upper Middle Tank*		*Total*	
	A[a]	*U*[b]	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Mourning dove	8	4	2	0	4	0	15	8	*29*	*12*
Black-throated sparrow	26	42	12	24	13	14	22	21	*73*	*101*
Turkey vulture	16	1	2	1	15	1	10	7	*43*	*10*
Ash-throated flycatcher	17	3	7	6	2	3	5	7	*31*	*19*
Black-tailed gnatcatcher	5	3	0	0	0	0	0	0	*5*	*3*
Lesser nighthawk	6	0	2	1	0	1	0	0	*8*	*2*
Spotted towhee	1	0	0	0	0	0	0	0	*1*	*0*
Cactus wren	7	6	8	4	3	3	2	5	*20*	*18*
Western kingbird	6	7	13	2	5	0	0	1	*24*	*10*
Scaled quail	4	5	0	0	0	1	10	2	*14*	*8*
Gambel's quail	1	0	0	0	1	0	0	2	*2*	*2*
Brown-headed cowbird	9	5	5	1	1	0	3	0	*18*	*6*
Northern mockingbird	11	4	1	3	8	2	19	10	*39*	*19*
Northern harrier	1	0	0	0	0	0	0	0	*1*	*0*
Eastern meadowlark	8	7	0	2	1	3	7	1	*16*	*13*
Western meadowlark	1	0	0	1	0	`1	1	0	*2*	*2*
Bullock's oriole	2	0	0	2	0	0	0	1	*2*	*3*
Brewer's sparrow	5	0	0	0	0	0	0	0	*5*	*0*
Scott's oriole	2	5	7	9	2	2	5	4	*16*	*20*
House finch	2	1	0	3	1	0	12	3	*15*	*7*
Vesper sparrow	1	0	0	0	0	0	0	0	*1*	*0*
Crissal thrasher	1	0	1	0	0	0	1	0	*3*	*0*
Chihuahuan raven	0	3	0	0	0	0	0	0	*0*	*3*
Bewick's wren	0	1	0	0	0	0	0	0	*0*	*1*
Pyrrhuloxia	0	1	1	9	0	0	0	1	*1*	*11*
MacGillivray's warbler	0	0	0	0	0	0	1	0	*1*	*0*
Rock wren	0	0	0	0	0	0	2	0	*2*	*0*
Say's phoebe	0	0	0	0	0	0	2	1	*2*	*1*
Rufous-crowned sparrow	0	0	0	1	0	0	2	0	*2*	*1*
Canyon towhee	0	0	0	0	0	0	7	1	*7*	*1*
Green-tailed towhee	0	0	0	0	1	1	1	0	*2*	*1*
Verdin	0	1	0	0	0	0	1	0	*1*	*1*
Greater roadrunner	0	0	2	0	0	0	0	1	*2*	*1*
Loggerhead shrike	0	0	0	1	0	3	0	0	*0*	*4*
Ladderback woodpecker	0	0	1	0	0	0	0	0	*1*	*0*
Swainson's hawk	0	0	0	0	0	1	0	0	*0*	*1*
Cassin's sparrow	2	0	0	0	0	0	0	0	*2*	*0*
Common nighthawk	4	1	1	1	1	1	0	0	*6*	*3*
Black-headed grosbeak	1	0	0	0	0	0	3	1	*4*	*1*
Virginia warbler	0	0	0	1	0	0	0	0	*0*	*1*
Flycatcher	0	0	0	0	1	0	0	0	*1*	*0*
Unknown species	0	0	1	0	0	0	0	0	*1*	*0*
Total number of species	*25*	*18*	*15*	*18*	*15*	*14*	*21*	*18*	*36*	*31*
Total number of individuals	*147*	*100*	*66*	*72*	*59*	*37*	*131*	*77*	*403*	*286*

[a] A = arroyo.
[b] U = upland.
Source: USAF, 1997a, b.

percent), mourning dove (6 percent), cactus wren (5 percent), Scott's oriole (5 percent), and western kingbird (5 percent). The black-throated sparrow was the most abundant species in the arroyo (18 percent of total birds recorded form the arroyos) and upland (35 percent) habitats. The only other common species that was more abundant in the uplands was Scott's oriole (4 percent of the total birds in the arroyos and 7 percent of the birds in the uplands). The cactus wren was almost equally abundant in the two habitats while the mourning dove, ash-throated flycatcher, western kingbird, and northern mockingbird were more abundant in the arroyos (Table D.3-5).

Neotropical migrants. Many bird species that breed in North America, winter in Central and South America (called neotropical migrants). Breeding Bird Survey data for a 26-year period from 1966 through 1991 indicate that the population levels of the majority of neotropical migrants have remained stable or increased, some have declined throughout this period, and many other species started to decline in the early 1980s (Robbins et al., 1993). Fragmentation of the forest on the breeding grounds and the elimination of optimum tropical wintering habitat are likely the two major reasons for these declines (Flather and Saure, 1996; Sheery and Holmes, 1996). In addition, the loss of important stop-over habitat used during migration may affect the survival of neotropical migrants (Moore et al., 1993).

In the West, over 60 percent of the neotropical migrants use riparian areas for stop-over habitat during migration or for breeding, and the importance of riparian habitat for breeding birds has been well-documented (Krueper, 1993). Most of these and other studies have taken place in mesic riparian areas dominated by species such as willow and cottonwoods. This type of habitat is very limited on McGregor Range; occurring at widely scattered small plots at some stock tanks. Most riparian areas consist of arroyo-riparian habitat along dry washes (see Section D.2 for a description of these habitat types). Prior to recent studies on McGregor Range, little was known about the importance of arroyo-riparian habitat for neotropical migrants and breeding birds in the Chihuahuan Desert (Kozma, 1995).

A recent study of neotropical migrants in the Chihuahuan Desert on Fort Bliss has shown that the number of individuals and species using the arroyo-riparian habitat is substantially greater than in the surrounding upland habitats (Kozma, 1995; U.S. Army, 1995c, 1996h, 1997g) (Table D.3-6). During this 5-year study birds were mist netted in arroyo and upland habitats in the northern part of McGregor Range (see Figure D.3-2). A total of 26 species of neotropical migrants were captured 341 times; 290 or 85 percent of these captures were in the arroyos; all species recorded more than once were captured more frequently in arroyos than uplands. Neotropical migrants captured all 5 years included the Virginia's (*Vermivora virginiae)*, orange-crowned (*Vermivora celata)*, and Wilson's (*Wilsonia pusilla)* warblers along with the, green-tailed towhee (*Pipilo chlorurus)*, Brewer's sparrow (*Spizella breweri*), hermit thrush (*Catharus guttatus)*, and blue-gray gnatcatcher (*Polioptila caerulea*). The most frequently captured neotropical migrants were the green-tailed towhee (58 captures in arroyos and 3 in upland), Brewer's sparrow (27 and 21), Wilson's warbler (41 and 1), Virginia's warbler (22 and 5), ruby-crowned kinglet (*Regulus calendula*) (25 and 1), black-chinned hummingbird (*Archilochus alexandri*) (15 and 5), and MacGillivray's warbler (*Oporonis tolmei*) (12 and 1) (Table D.3-6).

During this 5-year study, 403 short-distance migrants and winter and permanent residents consisting of 25 species were captured in mist nets in arroyo and upland habitats (Table D.3-6). A total of 285 or 71 percent of these birds were captured in arroyos, which is 14 percent less than for neotropical migrants. Except for the sage sparrow (*Amphispiza belli*), all species were captured more frequently in arroyos than uplands. The black-throated sparrow was the most frequently netted species (100 captures) in this group and its captures were almost equally divided between arroyos (54 percent) and uplands (46 percent). Overall, 745 birds were mist netted during this 5-year study and 575 (77 percent) were captured in arroyos and 170 (23 percent) in uplands (Table D.3-6) (U.S. Army, 1995c, 1996h, 1997g).

Table D.3-6. Neotropical Migrant and Short Distance Migrants, Wintering, and Permanent Resident Birds Captured in Arroyos (A) and Adjacent Uplands (U) in the Chihuahuan Desert on McGregor Range, Otero County, New Mexico

Species	*1993*		*1994*		*1995*		*1996*		*1997*		*Total*	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Neotropical Migrants[a]												
Green-tailed towhee	11	0	8	0	6	1	19	1	14	1	*58*	*3*
Wilson's warbler	10	0	5	0	9	0	6	1	11	0	*41*	*1*
Brewer's sparrow	4	1	0	1	2	1	6	0	15	18	*27*	*21*
Ruby-crowned kinglet	4	0	4	1	0	0	14	0	3	0	*25*	*1*
Virginia's warbler	2	0	7	5	1	0	6	0	6	0	*22*	*5*
Black-chinned hummingbird	4	1	1	0	0	0	1	0	9	4	*15*	*5*
MacGillivray's warbler	1	0	7	1	2	0	3	0	0	0	*13*	*1*
Orange-crowned warbler	5	0	2	0	1	0	1	0	4	0	*13*	*0*
Hermit thrush	2	0	3	0	1	0	2	0	3	0	*11*	*0*
Gray flycatcher	4	0	0	0	0	0	2	0	4	1	*10*	*1*
Blue-gray gnatcatcher	1	0	2	10	0	2	2	1	3	0	*8*	*4*
House wren	1	0	3	0	0	0	2	0	1	0	*7*	*0*
Dusky flycatcher	1	0	4	0	1	0	1	0	0	0	*7*	*0*
Lincoln's sparrow	0	0	0	0	0	0	1	0	5	0	*6*	*0*
Ash-throated flycatcher	2	2	0	0	0	1	3	0	0	1	*5*	*4*
Chipping sparrow	0	0	1	0	0	0	0	1	4	2	*5*	*3*
Western kingbird	2	0	0	0	0	0	1	0	1	0	*4*	*0*
Cordilleran flycatcher	1	0	0	0	1	0	1	0	0	0	*3*	*0*
Broad-tailed hummingbird	0	0	0	0	0	0	0	0	3	0	*3*	*0*
Hammond's flycatcher	1	0	0	0	1	0	0	0	0	0	*2*	*0*
Say's phoebe	0	0	1	0	0	0	1	0	0	0	*2*	*0*
Solitary vireo	0	0	0	0	0	0	1	0	0	0	*1*	*0*
Black-throated gray warbler	1	0	0	0	0	0	0	0	0	0	*1*	*0*
Warbling vireo	0	0	1	0	0	0	0	0	0	0	*1*	*0*
Audubon's warbler	0	0	0	0	0	0	0	1	0	0	*0*	*1*
Vesper sparrow	0	0	0	0	0	0	0	0	0	1	*0*	*1*
Lark bunting	0	1	0	0	0	0	0	0	0	0	*0*	*1*
Total	*57*	*4*	*49*	*9*	*25*	*5*	*73*	*5*	*86*	*28*	*290*	*52*
Short Distance Migrants and Winter and Permanent Residents												
Black-throated sparrow	9	7	9	13	2	2	14	18	20	6	*54*	*46*
White-crowned sparrow	9	1	10	9	7	0	4	0	22	3	*52*	*13*
Bewick's wren	7	1	10	1	1	0	22	7	8	1	*48*	*10*
Rufous-crowned sparrow	2	0	7	0	2	0	2	0	6	0	*19*	*0*
Canyon towhee	3	0	4	0	1	0	6	0	5	0	*19*	*0*
Verdin	3	0	4	0	0	1	11	2	0	0	*18*	*3*
Sage sparrow	0	1	0	1	0	0	2	5	11	12	*13*	*19*
Spotted towhee	0	0	0	0	1	0	3	0	8	0	*12*	*0*
Crissal thrasher	3	1	1	1	0	1	4	0	2	2	*10*	*5*
Cactus wren	2	0	1	2	0	0	1	1	4	2	*8*	*5*
Northern mockingbird	5	0	0	3	0	0	0	0	3	0	*8*	*3*
Black-tailed gnatcatcher	2	0	1	0	0	0	0	0	1	1	*4*	*1*
Pyrrhuloxia	0	0	1	0	0	0	0	0	2	0	*3*	*0*
Sage thrasher	2	0	0	1	0	0	0	0	1	1	*3*	*2*
House finch	0	1	0	0	2	0	0	1	0	0	*2*	*2*
Song sparrow	0	0	0	0	0	0	1	0	1	0	*2*	*0*
Rock wren	0	2	2	0	0	0	0	1	0	1	*2*	*4*

Table D.3-6. Neotropical Migrant and Short Distance Migrants, Wintering, and Permanent Resident Birds Captured in Arroyos (A) and Adjacent Uplands (U) in the Chihuahuan Desert on McGregor Range, Otero County, New Mexico (Continued)

Species	*1993*		*1994*		*1995*		*1996*		*1997*		*Total*	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Short Distance Migrants and Winter and Permanent Residents (Continued)												
Loggerhead shrike	0	1	1	1	0	0	0	0	1	0	*2*	*2*
Northern flicker	0	0	0	0	0	0	1	0	0	0	*1*	*0*
Dark-eyed junco	0	0	0	0	0	0	1	0	0	0	*1*	*0*
Gambel's quail	0	0	0	2	0	0	0	0	1	0	*1*	*2*
Mountain chickadee	0	0	0	0	0	0	0	0	1	0	*1*	*0*
Sparrow	0	0	0	0	0	0	0	0	1	0	*1*	*0*
Mourning dove	0	0	1	0	0	0	0	0	0	0	*1*	*0*
Scaled quail	0	0	0	0	0	0	0	0	0	1	*0*	*1*
Total	*47*	*15*	*52*	*34*	*16*	*4*	*72*	*35*	*98*	*30*	*285*	*118*
Grand total	*104*	*19*	*101*	*43*	*41*	*9*	*145*	*40*	*184*	*58*	*575*	*170*

[a] From Finch, 1992.
Source: Kozma, 1995; U.S. Army, 1995c, 1996h, 1997g.

These studies of nesting and migratory birds at McGregor Range have demonstrated that arroyo-riparian areas are used more consistently then upland habitats for nesting birds and stop over habitat for neotropical migrants passing through the Chihuahuan Desert. As indicated in Section D.2, approximately 2,478 miles of arroyo-riparian drainages with well-developed channels and sides occur on McGregor Range. Many of these drainages likely provide habitat that is used to a greater extent than adjacent uplands by nesting and migrating birds on McGregor Range.

Raptors. Data collected at 24 breeding bird sample locations showed that the Swainson's hawk (*Buteo swainsoni)* and turkey vulture (*Cathartes aura)* were the most common raptors observed in the desert shrublands during spring and summer of 1996 and 1997 (Table D.3-7) (U.S. Army, 1996g, 1997f). Other species observed were the red-tailed hawk (*Buteo jamaicensis)*, American kestrel (*Falco sparverius)*, northern harrier (*Circus cyaneus)*, prairie falcon (*Falco mexicanus)*, golden eagle (*Aquila chrysaetos)*, and sharp-shinned hawk (*Accipiter striatus)*. During surveys of the Otero Mesa escarpment in March and May 1997, one breeding pair of falcons consisting of a prairie falcon and a possible prairie/peregrine falcon (*Falco peregrinus)* hybrid was reported along the escarpment in the area of Rough Canyon (USAF, 1997c, d). Observations of this pair in May 1997 indicated that the nesting attempt was apparently unsuccessful. Numerous stick nests and a number of golden eagles were also observed in 1997 but nesting was not confirmed. In 1998, one active golden eagle nest was observed along the Otero Mesa escarpment just north of Pendajo Wash. Golden eagles were observed along the Hueco Mountain escarpment in New Mexico, but no nest was observed (U.S. Army, 1998i). The red-railed hawk, American kestrel, great horned owl (*Bubo virginianus)*, and barn owl (*Tyto alba)* nested in the area of the escarpment in 1997 (USAF, 1997h, i). During the raptor surveys, one ferruginous hawk (*Buteo regalis)* was reported as soaring over Otero Mesa above the escarpment south of Martin Canyon on March 28, 1997 (USAF, 1997c) and one immature aplomado falcon (*Falco femoralis)* was reported in the desert shrubland habitat and grassland below the escarpment south of Martin Canyon on May 23, 1997 (USAF, 1997d); these species are discussed in more detail in Section D.4. The aplomado falcon was not seen in the area during a subsequent survey on June 4, 1997 (USAF, 1997b) and it is assumed that the bird was no longer in the area. Data from 9 surveys during the winter of 1994 to 1995 and 18 surveys during the winter of 1995 to 1996 along a 14.9-mile route in the desert shrubland habitat showed that the golden

Table D.3-7. Raptors Observed During Breeding Bird Surveys on McGregor Range in 1996 and 1997

Species	*Location*							
	Tularosa Basin (24 sampling sites)		*Sacramento Mountains foothills (6 sampling sites)*		*Otero Mesa (12 sampling sites)*		*42 sample sites*	
	1996	1997	1996	1997	1996	1997	1996	1997
Turkey vulture	19 (0.8)	36 (1.5)	103 (17.2)	32 (5.3)	21 (1.8)	4 (0.3)	143 (3.40)	72 (1.7)
Swainson's hawk	23 (1.0)	21 (0.9)	0 (0.0)	0 (0.0)	4 (0.3)	5 (0.4)	27 (0.60)	26 (0.6)
Red-tailed hawk	7 (0.3)	7 (0.3)	6 (1.0)	1 (0.2)	8 (0.7)	10 (0.8)	21 (0.50)	18 (0.4)
American kestrel	6 (0.3)	5 (0.2)	0 (0.0)	0 (0.0)	2 (0.2)	3 (0.3)	8 (0.20)	8 (0.2)
Northern harrier	2 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	3 (0.10)	0 (0.0)
Prairie falcon	1 (0.04)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	2 (0.04)	0 (0.0)
Golden eagle	0 (0.0)	1 (0.04)	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.02)	1 (0.02)
Coopers hawk	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	1 (0.02)	0 (0.0)
Sharp-shinned hawk	0 (0.0)	1 (0.04)	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.02)	1 (0.02)

[a] Number observed per sampling site.
Source. U.S. Army, 1996g, 1997f.

eagle and red-tailed hawk were the most common wintering species (U.S. Army, 1995d, 1996i) (Table D.3-8). Eight species of raptors were recorded from the Tularosa Basin during aplomado falcon surveys during the winter and spring of 1996 and the red-tailed hawk, Swainson's hawk, and turkey vulture were the most common species observed. Other species observed were the merlin *(Falco columbarius)*, northern harrier (*Circus cyaneus*), American kestrel, and peregrine falcon (U.S. Army, 1997k).

Table D.3-8. Raptors Observed During Wintering Bald Eagle Surveys Along Four Routes on McGregor Range During the Winters of 1994-95 and 1995-96

Species	*Winter*					
	1994-95 (9 surveys along each route)			*1995-96 (18 surveys along each route)*[a]		
	Tularosa Basin (14.9mi)[b]	*Sacramento Mountains foothills (29.8 mi)*[c]	*Otero Mesa (34.8 mi)*[d]	*Tularosa Basin (14.9 mi)*[b]	*Sacramento Mountains foothills (28.9 mi)*[c]	*Otero Mesa (34.8 mi)*[d]
Golden eagle	35 (2.3)[e]	134 (4.5)	25 (0.7)	28 (1.9)	108 (3.7)	33 (0.9)
Red-tailed hawk	25 (1.7)	26 (0.9)	48 (1.4)	23 (1.5)	71 (2.5)	101 (2.9)
American kestrel	12 (0.8)	16 (0.5)	20 (0.6)	7 (0.5)	14 (0.5)	8 (0.2)
Bald eagle	1 (0.1)	26 (0.9)	1 (0.03)	0 (0.0)	13 (0.4)	1 (0.03)
Northern harrier	2 (0.1)	9 (0.3)	5 (0.1)	2 (0.1)	4 (0.1)	4 (0.1)
Prairie falcon	0 (0.0)	4 (0.1)	0 (0.0)	0 (0.0)	1 (0.03)	3 (0.1)
Sharp shinned hawk	0 (0.0)	4 (0.1)	0 (0.0)	1 (0.1)	5 (0.2)	0 (0.0)
Merlin	0 (0.0)	2 (0.1)	1(0.03)	0 (0.0)	0 (0.0)	0 (0.0)
Cooper's hawk	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)

[a] 17 surveys along the El Paso Route, 18 along the remainder.
[b] Grapevine Canyon route.
[c] El Paso and Culp Canyon routes.
[d] Mesa grassland route.
[e] Number seen per mile.
Source: U.S. Army, 1995d, 1996i.

Otero Mesa

Breeding birds. In 1996 and 1997, two sites were sampled for breeding birds in the black grama grasslands and six sites in the mesa grasslands (dominated by blue grama grass) on Otero Mesa (U.S. Army, 1996g, 1997f). An additional four sites were sampled in the black grama grasslands in the Tularosa Basin below the Otero Mesa. Results from these four sites are included in this section. In 1996, 36 species totaling 1,361 birds were tallied in the black grama grasslands and 40 species totaling 1,658 individuals were recorded from the mesa grasslands (Table D.3-9). As in the desert shrublands habitat, there was a substantial increase in the number of birds tallied in 1997 but a reduction in the number of species; approximately twice as many birds were recorded in 1997 than 1996. In 1996, the horned lark (*Eremophila alpestris)* was the most abundant species in the mesa grassland while the eastern meadowlark (*Sturnella magna)* was the most common species observed in the black grama grasslands (Table D.3-9). In 1997, the eastern meadowlark was the most common species in both grassland habitats. Other common breeding bird species were the black-throated sparrow, mourning dove, and northern mockingbird. Cassin's sparrow exhibited a large increase in numbers in 1997 as it did in the desert shrubland habitat. It more than doubled in the mesa grasslands and increased from 3 to 289 in the black grama grasslands.

Breeding bird surveys were conducted twice along transects at four swale/upland sites (total of eight transects) in the grassland habitat of Otero Mesa in 1997 (USAF, 1997a, b). Forty-five species comprising 720 individuals were recorded (Table D.3-10). For the combined transects, 83 percent more species were observed in the swales than uplands. To compare total birds recorded, only three swale/upland transect sets were used; the east swale was excluded because the upland transect was surveyed only once. A total of 345 and 262 birds were recorded on the swale and uplands respectively; there were 32 percent more birds in the swale. For the combined results for all eight transects, the eastern meadowlark was the most abundant species (17 percent of the total) followed by the northern mockingbird (13 percent), mourning dove (13 percent), black-throated sparrow (10 percent), horned lark (7 percent), lark sparrow (5 percent), and the cactus wren (5 percent). The eastern meadowlark, northern mockingbird, mourning dove, and cactus wren were more abundant in the swale while the black-throated sparrow, horned lark and lark sparrow were more abundant in the uplands (Table D.3-10).

Raptors. Data collected at 12 breeding bird sampling sites in grassland habitat in 1996 and 1997 on the Otero Mesa (eight sites) and Tularosa Basin (four sites) indicates that the turkey vulture was the most common species of raptor observed in 1996 and the red-tailed hawk was most common in 1997. Other species observed include the Swainson's hawk, American kestrel, northern harrier, and prairie falcon (see Table D.3-7) (U.S. Army, 1996g, 1997f). Additional species observed on Otero Mesa during the spring and summer were the golden eagle, merlin, burrowing owl (*Athene cunicularia)*, and great horned owl. The ferruginous hawk has been observed on the Mesa in the winter and spring (U.S. Army, 1994b). During surveys along a 34.8-mile route on Otero Mesa for wintering bald eagles (*Haliaeetus leucocephalus)*, the red-tailed hawk was the most common raptor observed (U.S. Army, 1995d, 1996i) (Table D.3-8). The golden eagle and American kestrel were also fairly common wintering species. The red-tailed hawk was also the most common raptor observed during aplomado falcon surveys on Otero Mesa during the winter and spring of 1996; the American kestrel and turkey vulture were other common species. Other species observed were the Swainson's hawk, northern harrier, golden eagle, and Ferruginous hawk (U.S. Army, 1997k).

Hueco Mountains

Breeding birds. Reconnaissance surveys for breeding birds were conducted in the Hueco Mountains on McGregor Range in June 1997 (U.S. Army, 1997h). Six routes totaling about 28 miles were traversed

Table D.3-9. Number of Birds Observed in 12 Study Plots in Two Grassland Habitat Types on McGregor Range, Otero County, New Mexico

Species	*Plant Communities*			
	Mesa grassland		*Black grama grassland*[a]	
	1996	*1997*	*1996*	*1997*
Horned lark	277	347	173	365
Eastern meadowlark	216	660	404	844
Black-throated sparrow	193	305	178	322
Mourning dove	191	487	41	201
Northern mockingbird	140	283	105	267
Ash-throated flycatcher	69	76	38	44
Scott's oriole	66	75	48	38
Lark sparrow	60	77	16	41
Common nighthawk	55	67	60	71
Cactus wren	45	105	25	56
Western meadowlark	45	9	2	12
Cassin's sparrow	43	112	3	289
Western kingbird	38	55	40	60
Loggerhead shrike	27	39	26	22
Brewers sparrow	15	17	8	1
Turkey vulture	15	3	6	1
Chihuahuan raven	14	10	2	6
House finch	11	26	10	11
Lark bunting	9	18	44	4
Barn swallow	7	4	1	0
Curved billed thrasher	6	11	0	7
Cliff swallow	5	2	2	0
Red-tailed hawk	5	9	3	1
Swainson's hawk	3	4	1	1
Audubon's warbler	3	0	0	0
Crissal thrasher	2	4	0	1
Bullock's oriole	2	0	0	0
Northern rough-winged swallow	2	0	1	0
Violet-green swallow	2	0	0	0
Pyrrhuloxia	1	0	1	0
Green-tailed towhee	1	0	1	0
Brown-headed cowbird	1	16	0	10
Cassin's' kingbird	1	1	1	0
Northern harrier	1	0	0	0
Say's phoebe	1	6	0	0
Spotted towhee	1	0	0	0
Prairie falcon	1	0	0	0
American kestrel	1	2	1	1
Common raven	1	6	0	0
Coopers hawk	1	0	0	0
Scaled quail	0	8	2	41
Black-tailed gnatcatcher	0	1	1	0
Gambel's quail	0	1	1	6
Lesser nighthawk	0	0	2	0
Song sparrow	0	0	1	0
Ladder-backed woodpecker	0	4	4	2
Vesper sparrow	0	3	3	0

Table D.3-9. Number of Birds Observed in 12 Study Plots in Two Grassland Habitat Types on McGregor Range, Otero County, New Mexico (Continued)

Species	*Plant Communities*			
	Mesa grassland		*Black grama grassland*[a]	
	1996	*1997*	*1996*	*1997*
Chipping sparrow	0	0	7	1
Wilson's warbler	0	0	0	1
Canyon towhee	0	0	0	1
Common bushtit	0	0	0	0
Broad-tailed hummingbird	0	9	0	1
Killdeer	0	2	0	0
Unidentified bird	81	0	99	0
Locations sampled	*6*	*6*	*6*	*6*
Number of species	*40*	*37*	*36*	*32*
Number of individuals	*1,658*	*2,864*	*1,361*	*2,729*

[a]Two sampling sites on Otero Mesa and four below Otero Mesa in the Tularosa Basin.
Source: U.S. Army, 1996g, 1997f.

Table D.3-10. Birds Recorded During Breeding Bird Surveys in Swale and Upland Habitats in the Otero Mesa Grassland Plant Communities on McGregor Range, Otero County, New Mexico

Species	*South Swale*		*North Swale*		*East Swale*		*Lower South Swale*		*Total*	
	S[a]	*U*[b]	*S*	*U*	*S*	*U*	*S*	*U*	*S*	*U*
Mourning dove	11	10	18	14	16	4	7	4	*52*	*38*
Black-throated sparrow	5	15	7	28	5	2	3	4	*20*	*49*
Turkey vulture	0	0	0	0	2	0	0	1	*2*	*1*
Ash-throated flycatcher	2	5	3	3	4	1	5	0	*14*	*9*
Spotted towhee	0	0	1	0	0	0	0	0	*1*	*0*
Cactus wren	7	0	8	5	4	1	7	5	*26*	*11*
Western kingbird	4	1	6	0	4	1	6	1	*20*	*3*
Scaled quail	0	0	11	4	0	0	0	0	*11*	*4*
Brown-headed cowbird	0	0	11	1	6	0	1	0	*18*	*1*
Northern mockingbird	29	4	18	10	14	5	7	5	*68*	*24*
Eastern meadowlark	33	19	26	13	4	4	12	14	*75*	*50*
Western meadowlark	0	0	0	0	0	0	0	1	*0*	*1*
Brewer's sparrow	0	0	6	0	6	0	0	1	*12*	*1*
Scott's oriole	0	1	0	2	1	0	2	1	*3*	*4*
House finch	0	0	6	0	6	0	0	0	*12*	*0*
Crissal thrasher	1	0	1	0	0	0	1	1	*3*	*1*
Pyrrhuloxia	0	0	0	0	0	1	0	0	*0*	*1*
Rock wren	0	0	1	0	0	0	0	0	*1*	*0*
Say's phoebe	0	0	1	0	1	0	2	1	*4*	*1*
Rufous-crowned sparrow	0	0	0	0	1	0	0	0	*1*	*0*
Canyon towhee	0	0	0	0	2	0	0	0	*2*	*0*
Green-tailed towhee	0	0	0	0	1	0	0	0	*1*	*0*
Dusky flycatcher	1	0	0	0	0	0	0	0	*1*	*0*
Killdeer	1	0	0	0	0	0	0	0	*1*	*0*

Table D.3-10. Birds Recorded During Breeding Bird Surveys in Swale and Upland Habitats in the Otero Mesa Grassland Plant Communities on McGregor Range, Otero County, New Mexico (Continued)

Species	*South Swale*		*North Swale*		*East Swale*		*Lower South Swale*		*Total*	
	S[a]	*U*[b]	*S*	*U*	*S*	*U*	*S*	*U*	*S*	*U*
Hermit thrush	1	0	0	0	0	0	0	0	*1*	*0*
Lark sparrow	6	16	3	0	0	0	8	5	*17*	*21*
Western wood pewee	2	0	1	0	3	0	0	0	*6*	*0*
Sage thrasher	1	0	0	0	0	0	0	0	*1*	*0*
Curve-billed thrasher	0	0	2	0	0	0	3	0	*5*	*0*
Loggerhead shrike	2	0	4	0	2	0	0	2	*8*	*2*
Ladderback woodpecker	2	0	0	1	0	0	0	0	*2*	*1*
Lark bunting	2	0	0	0	0	0	0	0	*2*	*0*
Horned lark	2	38	0	0	0	0	4	9	*6*	*47*
Broad-tailed hummingbird	0	1	0	0	0	0	0	0	*0*	*1*
White-crowned sparrow	0	0	1	0	0	0	0	0	*1*	*0*
Red-tailed hawk	0	0	2	0	0	1	0	0	*2*	*1*
Swainson's hawk	0	0	1	0	0	0	0	0	*1*	*0*
Cassin's sparrow	4	1	5	1	0	0	0	0	*9*	*2*
Common nighthawk	6	1	5	9	2	3	1	0	*14*	*13*
Eastern kingbird	1	0	0	0	0	0	0	0	*1*	*0*
Brewers' blackbird	0	0	0	0	0	0	2	0	*2*	*0*
American kestrel	0	0	0	0	0	0	1	0	*1*	*0*
Meadowlark	0	0	0	0	0	2	2	0	*2*	*2*
Black-headed grosbeak	0	0	0	0	1	0	0	0	*1*	*0*
Violet-green swallow	0	0	0	0	1	0	0	0	*1*	*0*
Cassin's kingbird	0	0	0	0	1	0	0	0	*1*	*0*
Unknown species	0	4	0	0	1	0	0	0	*1*	*4*
Number of species	*21*	*11*	*24*	*12*	*22*	*10*	*17*	*14*	*42*	*23*
Number of individuals	*123*	*116*	*148*	*91*	*88*	*25*	*74*	*55*	*433*	*287*

[a] S = swale.
[b] U = upland.
Source: USAF, 1997a, b.

along arroyos and in uplands within an approximate 6,700-acre area. The habitat traversed consisted principally of foothill desert shrub dominated by viscid acacia, creosotebush, agave (*Agave lechuguilla)*, and grama grass (U.S. Army, 1996d). Desert willow was common along the larger washes while little sumac, tarbush, mesquite, creosotebush, prickly pear, yucca, viscid acacia, and Apache plume were frequently observed along narrower drainages. No pinyon pine/juniper habitat or other tree-dominated areas were in the areas surveyed.

A total of 40 species comprising 737 individuals were recorded during six surveys on June 10 and 12, 1997 (Table D.3-11). Almost 200 black-throated sparrows were recorded and this was the most common species encountered. Other common species were the northern mockingbird (10 percent), cactus wren (7

Table D.3-11. Birds Recorded During Breeding Bird Surveys in the Hueco Mountains, on McGregor Range, Otero County, New Mexico, June, 1977

Species	*10 June*				*12 June*				*Grand Total*
	S-1[a]	*S-2*	*S-3*	*Total*	*S-1*	*S-2*	*S-3*	*Total*	
Black-throated sparrow	31	48	22	*101*	34	51	13	*98*	*199*
Northern mockingbird	18	16	18	*52*	8	4	7	*19*	*71*
Cactus wren	12	1	7	*20*	17	3	10	*30*	*50*
Canyon towhee	7	10	11	*28*	5	6	4	*15*	*43*
House finch	17	7	2	*26*	10	6	0	*16*	*42*
Mourning dove	6	5	6	*17*	10	4	10	*24*	*41*
Scaled quail	5	10	15	*30*	1	3	5	*9*	*39*
Scott's oriole	6	3	4	*13*	9	6	1	*16*	*29*
Ash-throated flycatcher	3	5	7	*15*	8	5	0	*13*	*28*
Rock wren	1	0	11	*12*	2	7	1	*10*	*22*
Ladderback woodpecker	8	5	0	*13*	4	3	0	*7*	*20*
Rufous crowned sparrow	2	0	8	*10*	0	9	1	*10*	*20*
Gambel's quail	3	1	6	*10*	0	4	3	*7*	*17*
Pyrrhuloxia	4	3	3	*10*	2	1	0	*3*	*13*
Blue grosbeak	0	4	1	*5*	2	2	2	*6*	*11*
Turkey vulture	1	5	2	*8*	0	2	0	*2*	*10*
Loggerhead shrike	0	2	1	*3*	1	0	4	*5*	*8*
Red-tailed hawk	3	1	1	*5*	0	2	0	*2*	*7*
Crissal thrasher	3	1	1	*5*	0	1	0	*1*	*6*
Verdin	0	5	0	*5*	0	0	1	*1*	*6*
Say's phoebe	0	2	0	*2*	0	4	0	*4*	*6*
Hummingbird[b]	1	0	4	*5*	0	0	0	*0*	*5*
Western kingbird	0	1	0	*1*	3	1	0	*4*	*5*
Black-tailed gnatcatcher	0	4	0	*4*	0	0	0	*0*	*4*
Common nighthawk	0	1	1	*2*	0	2	0	*2*	*4*
Broad-tailed hummingbird	0	3	0	*3*	0	0	0	*0*	*3*
Lesser goldfinch	0	3	0	*3*	0	0	0	*0*	*3*
Brown-headed cowbird	2	0	0	*2*	1	0	0	*1*	*3*
Greater roadrunner	0	0	1	*1*	0	1	1	*2*	*3*
Lesser nighthawk	0	0	0	*0*	0	1	2	*3*	*3*
Common poorwill	1	0	1	*2*	0	0	0	*0*	*2*
White-winged dove	0	0	2	*2*	0	0	0	*0*	*2*
Swift	0	0	1	*1*	0	1	0	*1*	*2*
Empidonax	0	0	0	*0*	0	0	2	*2*	*2*
Thrasher[b]	1	0	0	*1*	0	0	0	*0*	*1*
Black-chinned sparrow	1	0	0	*1*	0	0	0	*0*	*1*
Curve-billed thrasher	0	1	0	*1*	0	0	0	*0*	*1*
American kestrel	0	1	0	*1*	0	0	0	*0*	*1*
Black-chinned hummingbird	0	0	1	*1*	0	0	0	*0*	*1*
Eastern meadowlark	0	0	0	*0*	0	0	1	*1*	*1*
Swainson's hawk	0	0	0	*0*	0	0	1	*1*	*1*
Bunting species[c]									*1*
Total number of species	*22*	*26*	*24*	*35*	*16*	*24*	*18*	*30*	*40*
Total number of individuals	*136*	*148*	*137*	*421*	*117*	*129*	*69*	*315*	*737*

[a] "S-1" refers to survey number.
[b] Not counted as separate species.
[c] Hybrid bunting observed at New Tank in the Hueco Mountains on June 9, 1997.
Source: U.S. Army, 1997h.

percent), canyon towhee (6 percent), house finch (6 percent), mourning dove (6 percent), scaled quail (*Callipepla squamata)* (5 percent), Scott's oriole (4 percent), and ash-throated flycatcher (4 percent). Scaled and Gambels quail (*Callipepla gambelli)* were fairly common and were most frequently associated with the larger washes (U.S. Army, 1997h).

The turkey vulture and red-tailed hawk were the most frequently observed raptors in the Hueco Mountains in June 1997, while the Swainson's hawk and American kestrel were infrequently detected. Raptor surveys were conducted along the east facing Hueco Mountain escarpment, as well as in the interior of these mountains. The red-tailed hawk, American kestrel, and golden eagle were observed along the escarpment. However, the surveys indicated that the golden eagle probably does not nest along the escarpment, although the red-tailed hawk and American kestrel may. Observations in the interior of the Hueco Mountains on McGregor Range showed that there were few cliffs that would support cliff-nesting raptors such as the golden eagle or prairie falcon, and these two species were not observed in this area. The turkey vulture, red-tailed hawk, and American kestrel were observed and these species likely nest in the Hueco Mountains (U.S. Army, 1999). There are no data regarding wintering raptors in the Hueco Mountains, but the same species that winter elsewhere in the desert shrubland and grassland habitats on McGregor range likely occur in these mountains.

Sacramento Mountains

Breeding birds. The Sacramento Mountains foothills occur on McGregor Range, and breeding birds were sampled in the pinyon pine/juniper woods. In 1996 and 1997, six locations were sampled for nesting birds in this habitat; 2,240 birds comprised of 65 species were recorded in 1996 and 2,986 birds form 62 species were recorded in 1997 (Table D.3-12). Although more birds were observed in 1997, the increase was less than observed in the desert shrublands and grasslands in 1997. The most common birds recorded in 1996 were the northern mockingbird, common bushtit (*Psaltriparus minimus)*, spotted towhee (*Pipilo maculatus)*, black-chinned sparrow (*Spizella atrogularis)*, black-headed grosbeak (*Pheucticus melanocephalus)*, mourning dove, and western scrub jay (*Aphelocoma californica).* In 1997, the spotted towhee was clearly the most common species followed by the common nighthawk (*Chordeiles minor),* and the other species listed above for 1996 (U.S. Army, 1996g, 1997f) (Table D.3-12).

Raptors. Data collected from six breeding bird sampling locations in 1996 and 1997 in the pinyon pine/juniper habitat in the Sacramento Mountains foothills indicated the turkey vulture was the most common species of raptor observed. The red-tailed hawk was observed occasionally while the golden eagle and sharp-shinned hawk were seen once in 1996 (see Table D.3-7) (U.S. Army, 1996g, 1997f). The bald eagle winters in small numbers in the foothills (Table D.3-8) (U.S. Army, 1995d, 1996i). During the wintering bald eagle surveys, the golden eagle was the most common species observed both winters. The red-tailed hawk was also commonly observed especially during the winter of 1995 to 1996; the bald eagle and the American kestrel was also a fairly common wintering species (see Table D.3-8). The northern harrier, sharp-shinned hawk, prairie falcon, and merlin were also observed. The great horned owl and western screech owl (*Otus kennicotti)* were detected during spotted owl (*Strix occidentalis)* surveys during the winter of 1995 to 1996; no spotted owls were observed (U.S. Army, 1997k).

D.3.3 Mammals

A total of 58 mammal species are known to occur and an additional 19 species have the potential to occur on the Fort Bliss Training Complex (Table D.3-13). Seventeen species of bats occur or have the potential to occur on Fort Bliss. There have been few studies of bats on Fort Bliss. Two maternity colonies of the fringed myotis (*Myotis thysanodes)* were observed in the pinyon-juniper habitat in the Sacramento Mountains foothills on McGregor Range in 1979 (Smartt, 1980). The California myotis (*Myotis*

Table D.3-12. Number of Birds Observed in Six Study Plots in the Pinyon/Juniper Habitat Type on McGregor Range, Otero County, New Mexico

Species	*Pinyon Pine/Juniper Plant Community*	
	1996	*1997*
Northern mockingbird	250	220
Common bushtit	222	203
Spotted towhee	209	431
Black-chinned sparrow	185	166
Black-headed grosbeak	156	275
Mourning dove	111	58
Scrub jay	107	115
Turkey vulture	103	32
House finch	94	69
Ash-throated flycatcher	78	91
Bewick's wren	78	183
Pinyon jay	77	169
Common nighthawk	50	300
Cassin's' kingbird	40	122
Juniper titmouse	39	36
Rufous-crowned sparrow	30	103
Scott's oriole	22	25
Black-chinned hummingbird	22	6
Brown-headed cowbird	20	51
Green-tailed towhee	17	3
Western tanager	16	43
Common raven	12	22
Townsend's solitaire	12	0
Black-throated gray warbler	11	0
Audubon's warbler	10	5
Canyon towhee	10	20
Gray-headed junco	10	1
Western wood-pewee	10	10
Western kingbird	8	4
Cliff swallow	8	3
Red-tailed hawk	6	1
Plumbeous vireo	6	15
Hermit thrush	6	0
Chihuahuan raven	5	33
Wilson's warbler	5	2
Mountain chickadee	5	18
Gambel's quail	4	1
Northern flicker	4	2
White-crowned sparrow	4	0
American robin	4	3
Eastern meadowlark	3	10
Pine siskin	3	3
Virginia's warbler	3	3
Violet-green swallow	3	5
Cedar waxwing	3	0
Golden-crowned kinglet	3	0
Gray flycatcher	3	2
MacGillivray's warbler	2	1

Table D.3-12. Number of Birds Observed in Six Study Plots in the Pinyon/Juniper Habitat Type on McGregor Range, Otero County, New Mexico (Continued)

Species	*Pinyon Pine/Juniper Plant Community*	
	1996	*1997*
Western bluebird	2	3
Brewers sparrow	1	0
Loggerhead shrike	1	0
Barn swallow	1	0
Blue-gray gnatcatcher	1	1
Curved billed thrasher	1	5
Say's phoebe	1	12
Orange crowned warbler	1	1
White-throated swift	1	0
Rock wren	1	10
Coopers hawk	1	0
Golden eagle	1	0
Hairy woodpecker	1	0
Hepatic tanager	1	3
Rose-breasted grosbeak	1	0
Olive-sided flycatcher	1	0
Sharp-shinned hawk	1	0
Black-throated sparrow	0	4
Ruby-crowned kinglet	0	8
Crissal thrasher	0	1
Black-tailed gnatcatcher	0	7
Cassin's sparrow	0	1
Greater roadrunner	0	1
House wren	0	8
Ladder-backed woodpecker	0	19
Brewer's blackbird	0	1
Chipping sparrow	0	8
Lark sparrow	0	2
White-winged dove	0	3
Warbling vireo	0	4
Broad-tailed hummingbird	0	17
Summer tanager	0	1
Lesser goldfinch	0	1
Unidentified bird	133	0
Locations sampled	*6*	*6*
Number of species	*65*	*62*
Number of individuals	*2,240*	*2,986*

Source: U.S. Army, 1996g, 1997f.

californicus) was observed in the pinyon/juniper habitat in the Sacramento Mountains foothills, the creosotebush and the grassland habitats on Otero Mesa; this species was most common in the grassland habitat (Smartt, 1980). Surveys were conducted along the Otero Mesa escarpment and nearby stock tanks that contained water in May and August 1997and June 1998 (Figure D.3-3) (USAF, 1997e, f; U.S. Army, 1998j). During the May 1997 survey, numerous cracks, crevices, and caves were searched for bats with negative results. However, during August, surveys of selected cliff areas along the escarpment yielded small numbers of bats exiting the cliff face in numerous areas. The bats along the escarpment appear to

Table D.3-13. Mammals Known to Occur and Could Possibly Occur on McGregor Range, Otero County, New Mexico

Species		*Occurrence on McGregor Range*	
Common name	*Scientific name*	*Known*	*Possible*
Virginia opossum	*Didelphis virginianus*		●
Desert shrew	*Notiosorex crawfordi*	●	
Yuma Myotis	*Myotis yumanensis*		●
Cave Myotis	*Myotis velifera*		●
Little Brown Myotis	*Myotis lucifugus*		●
Long-legged Myotis	*Myotis volans*		●
Fringed Myotis	*Myotis thysanodes*	●	
California Myotis	*Myotis californicus*	●	
Small-footed Myotis	*Myotis leibii*		●
Spotted bat	*Euderma maculatum*		●
Silver-haired bat	*Lasionycteris noctivagans*	●	
Hoary bat	*Lasiurus cinereus*	●	
Western pipistrelle	*Pipistrellus hesperus*	●	
Big brown bat	*Eptesicus fuscus*	●	
Townsend's big-eared bat	*Corynorhinus townsendii*		●
Pallid bat	*Antrozous pallidus*	●	
Brazilian free-tailed bat	*Tadarida braziliensis*	●	
Pocketed free-tailed bat	*Tadarida femorosacca*		●
Big free-tailed bat	*Nyctinomops macrotis*		●
Desert cottontail	*Sylvilagus audubonii*	●	
Eastern cottontail	*Sylvilagus floridanus*		●
Black-tailed jack rabbit	*Lepus californicus*	●	
Least chipmunk	*Tamias minimus*		●
Gray-footed chipmunk	*Tamias canipes*	●	
Gray-collared chipmunk	*Tamias cinereicollis*	●	
Organ Mountain Colorado chipmunk	*Tamias quadrivittatus australis*	●	
Texas antelope squirrel	*Ammospermophilus interpres*	●	
Spotted ground squirrel	*Spermophilus spilosoma*	●	
Thirteen-lined ground squirrel	*Spermophilus tridecimlineatus*		●
Rock squirrel	*Spermophilus variegatus*	●	
Mexican ground squirrel	*Spermophilus mexicanus*		●
Black-tailed prairie dog	*Cynomys ludovicianus*	●	
Yellow-faced pocket gopher	*Cratogeomys castanops*	●	
Botta's pocket gopher	*Thomomys bottae*	●	
Plains pocket gopher	*Geomys bursarius aernarius*		●
Silky pocket mouse	*Perognathus flavus*	●	
Plains pocket mouse	*Perognathus flavescens*	●	
Apache pocket mouse	*Perognathus apache*		●
Chihuahuan pocket mouse	*Chaetodipus eremicus*	●	

Table D.3-13. Mammals Known to Occur and Could Possibly Occur on McGregor Range, Otero County, New Mexico (Continued)

Species		*Occurrence on McGregor Range*	
Common name	*Scientific name*	*Known*	*Possible*
Hispid pocket mouse	*Chaetodipus hispidus*	●	
Desert pocket mouse	*Chaetodipus penicillatus*	●	
Rock pocket mouse	*Chaetodipus intermedius*	●	
Banner-tailed kangaroo rat	*Dipodomys spectabilis*	●	
Ord's kangaroo rat	*Dipodomys ordii*	●	
Merriam's kangaroo rat	*Dipodomys merriami*	●	
Plains harvest mouse	*Reithrodontomys montanus*	●	
Western harvest mouse	*Reithrodontomys megalotis*	●	
Cactus mouse	*Peromyscus eremicus*	●	
Deer mouse	*Peromyscus maniculatus*	●	
White-footed mouse	*Peromyscus leucopus*	●	
Brush mouse	*Peromyscus boylii*	●	
Northern rock mouse	*Peromyscus nasutus*		●
Mearn's grasshopper mouse	*Onychomys arenicola*	●	
Short-tailed grasshopper mouse	*Onychomys leucogaster*	●	
Hispid cotton rat	*Sigmodon hispidus*	●	
Gray wood rat	*Neotoma micropus*	●	
White-throated wood rat	*Neotoma albigula*	●	
Mexican meadow mouse	*Microtus mexicanus*	●	
House mouse	*Mus musculus*	●	
Porcupine	*Erethizon dorsatum*	●	
Coyote	*Canis latrans*	●	
Kit fox	*Vulpes macrotis*	●	
Red fox	*Vulpes vulpes*		●
Gray fox	*Urocyon cinereoargenteus*	●	
Black bear	*Ursus americanus*	●	
Ringtail	*Bassariscus astutus*	●	
Raccoon	*Procyon lotor*		●
Long-tailed weasel	*Mustela frenata*	●	
Badger	*Taxidea taxus*	●	
Western spotted skunk	*Spilogale gracilis*	●	
Striped skunk	*Mephitis mephitis*	●	
Mountain lion	*Puma concolor*	●	
Bobcat	*Lynx rufus*	●	
Javelina or collared peccary	*Dicotyles tajacu*	●	
Mule deer	*Odocoileus hemionus*	●	
Pronghorn antelope	*Antilocapra americana*	●	
Oryx	*Oryx gazella*	●	
Total		*58*	*19*

Sources: U.S. Army, 1997i; Smartt, 1980.

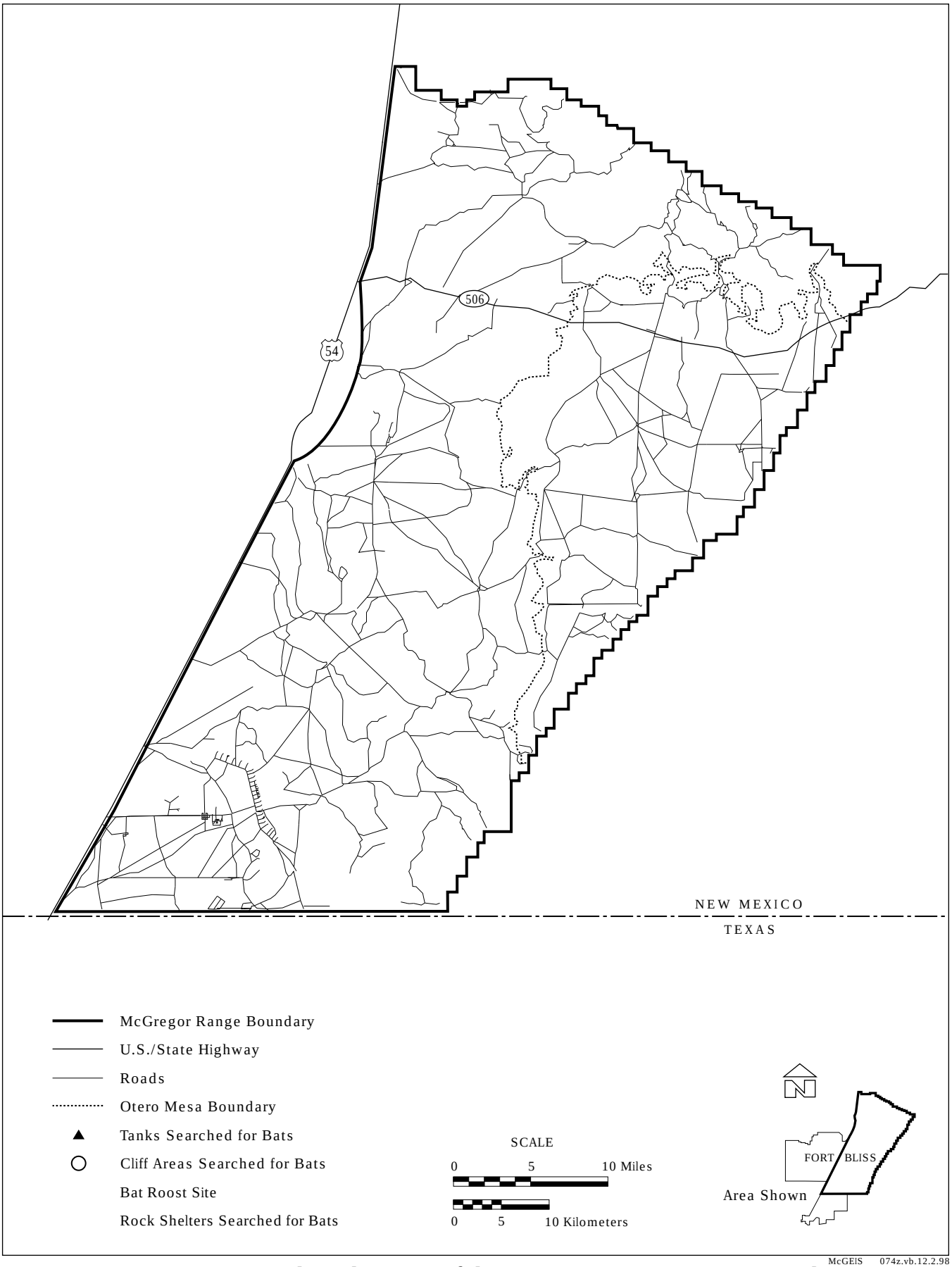

Figure D.3-3. Tanks and Sections of the Otero Mesa Escarpment Surveyed for Bat Fauna in 1997 and 1998.

roost in small scattered groups and no large roost sites were observed. Western pipistrelles (*Pipistrellus hesperus)*, *Myotis*, and free-tailed bats (*Tadarida*) were observed emerging from the escarpment. Observation at four tanks in the area of the escarpment showed relatively high bat activity at Mack and Double tanks and low activity at Martin and West Mesa Rim tanks. Various species were noted including pipistrelles, *Myotis*, and free-tail bats (USAF, 1997e, f). Surveys in 1998 indicated that *Myotis* sp. still maintained a maternity colony at one of the 1979 sites. Behavioral characteristics indicated it was likely still a fringed Myotis colony (U.S. Army, 1998j).

Fort Bliss is conducting rodent surveys at 24 sampling sites in 12 habitat types on McGregor Range in 1997 and 1998. In 1997, trapping took place from May 12 through June 8, and 19 species comprising 941 animals were trapped during 3,600 census line trapnights (U.S. Army, 1997i) (Table D.3-14). The number trapped at the two census locations for each habitat were combined in Table D.3-14. The most abundant species were the silky pocket mouse (*Perognathus flavus)* which was captured 189 times (20 percent of total) and Merriam's kangaroo rat (*Dipodomys merriami)* 138 times (15 percent of total). Both these species were recorded from all but one habitat type and the silky pocket mouse was most common in the grassland habitats while Merriam's kangaroo rat was more common in the desert scrub and arroyo habitats. Other common species were the deer mouse (*Peromyscus maniculatus)*, hispid cotton rat (*Sigmodon hispidus)*, white-footed mouse (*Peromyscus leucopus)*, cactus mouse (*Peromyscus eremicus)*, western harvest mouse (*Reithrodontomys megalotis)*, and Ord's kangaroo rat (*Dipodomys ordii)*. The deer mouse and white-footed mouse were found in at least 10 of the 12 habitats; the deer mouse was most common in the acacia scrub habitat while the white-footed mouse was most common in the swale. The hispid cotton rat and western harvest mouse were also common in the swale where 57 of 75 and 34 of 61 of the animals captured were in this area respectively. Like the deer mouse, the cactus mouse was most common in the acacia scrub (27 of 62 captured in this area).

The largest number of animals were captured in the swale (151) and the acacia scrub (123). The largest number of species were in the sandy arroyo scrub (14), *Chilopsis* sp. arroyo (14), mixed desert scrub (13), acacia scrub (13), and creosote-grassland (84). The lowest number of individuals (15) and species (7) were recorded in the mesquite-coppice dunes. A relatively small number of individuals (41) and species (8) were also recorded in the grama grasslands (Table D.3-14) (U.S. Army, 1997i).

Other rodents observed were the Texas antelope squirrel (*Ammospermophilus interpres)*, rock squirrel (*Spermophilus variegatus)*, Botta's pocket gopher (*Thomomys bottae)*, and yellow-faced pocket gopher (*Cratogeomys castanops)*. The porcupine (*Erethizon dorsatum)*, coyote (*Canis latrans)*, badger (*Taxidea taxus)*, and bobcat *(Lynx rufus)* were observed (U.S. Army, 1997i).

A study of rodents in eight locations in arroyos and associated upland habitats in the Chihuahuan Desert took place for 2 years on McGregor Range (U.S. Army, 1996h). Sampling took place along an elevation gradient in the upper, middle, and lower zones along the arroyos. The relative abundance of rodents was greater in the arroyos than the uplands and at the lower elevation sites than the upper elevation sites. A total of 5,127 individuals representing 18 species of nocturnal rodents were captured during the 69,120 trap nights. The white-footed mouse, deer mouse, western harvest mouse, white-throated woodrat (*Neotoma albigula)*, hispid cotton rat, rock pocket mouse (*Chaetodipus intermedius)*, and desert pocket mouse (*C. penicillatus)* had higher relative abundance in the arroyos than the uplands. Merriam's kangaroo rat, and the desert plains pocket mouse (*Perognathus flavescens)* were more abundant in the uplands than the arroyos. The pattern of higher rodent species richness and abundance in arroyos was consistent for both study years even though the number of rodents captured was 34 percent less in 1994 than 1993 (U.S. Army, 1996o).

Table D.3-14. Mammals Recorded from 12 Habitat Types on McGregor Range, Otero County, New Mexico

Species	*Habitat Type*												*Total*
	Desert Shrub					*Grassland*				*Arroyo/Swale*			
	DS1	*DS2*	*DS3*	*DS4*	*DS5*	*G1*	*G2*	*G3*	*G4*	*A1*	*A2*	*A3*	
Spotted ground squirrel	0	0	0[a]	0	0	1	1	0	0	0	0	0	*2*
Plains pocket mouse	0	0[a]	0[a]	0	0	0	0	0	0	1	0	0	*1*
Silky pocket mouse	16	10	0[a]	3	3	32	38	45	20	1	8	13	*189*
Chihuahuan pocket mouse	0	9	0[a]	5	13	0	0	0	2	7	0	2	*38*
Hispid pocket mouse	0	0	0	0	0[a]	2	2	7	0	0	0	0	*11*
Rock pocket mouse	0	1	0	1	24	0	0	0	19	11	3	0	*59*
Merriam's kangaroo rat	19	29	11	8	16	0	14	0	5	10	21	5	*138*
Ord's kangaroo rat	0	0[a]	3	42	0	0[a]	3	4	0	1	3	1	*57*
Banner-tailed kangaroo rat	0	0	0	0	0	0	2	0[a]	0	0	0	0	*2*
Western harvest mouse	7	0[a]	0	0[a]	1	0	2	7	0	1	9	34	*61*
Plains harvest mouse	0	0	0	0	0	0[a]	0	0[a]	0	0	12	3	*15*
Cactus mouse	1	7	0	6	27	0	0	0	10	9	2	0	*62*
White-footed mouse	7	0[a]	0	2	2	0	9	7	3	4	8	21	*63*
Deer mouse	8	10	0	9	27	0	4	2	4	9	5	13	*91*
Mearn's grasshopper mouse	3	0	0	0	1	3	5	0[a]	0	0	2	2	*16*
Short-tailed grasshopper mouse	0	2	0	9	0	3	1	0	2	1	1	0	*19*
Hispid cotton rat	11	0	0	0	1	0[a]	1	3	0	0[a]	2	57	*75*
White-throated wood rat	0	0[a]	1	4	7	0	0	0[a]	3	13	3	0	*31*
Gray wood rat	3	1	0	0	1	0	2	0	0	3	1	0	*11*
Total species	*9*	*13*	*7*	*11*	*13*	*8*	*13*	*11*	*9*	*14*	*14*	*10*	*19*
Total individuals	*75*	*69*	*15*	*89*	*123*	*41*	*84*	*75*	*68*	*71*	*80*	*151*	*941*

NOTES: See Table D.3-13 for scientific names. Habitat types are as follows; DS1 = creosote-tarbush scrub, DS2 = mixed desert scrub, DS3 = coppice dunes, DS4 = nonstabilized sand dune, DS5 = acacia scrub, G1 = grama grassland, G2 = creosote grassland, G3 = yucca grassland, G4 = yucca-nolina-sotol, A1 = sandy arroyo scrub, A2 = *Chilopsis* arroyo, A3 = swale.

[a] Species not taken along census line but observed in habitat and therefore is part total species.

Source: U.S. Army, 1997i.

Two lagomorphs, the desert cottontail (*Sylvilagus audubonii),* and black-tailed jackrabbit (*Lepus californicus)* are common on post. Smartt (1980) found these species to be more common in the desert shrubland habitat than the grassland habitat on Otero Mesa. The density of lagomorphs was estimated on McGregor Range from 85 transect lines totaling 141 miles in 1994 and 88 transect lines totaling 148 miles in 1995. Estimated density in 1994 was 22 lagomorphs per square mile and in 1995 and 13 per square mile in 1995. The reduction from 1994 to 1995 was not statistically significant (U.S. Army, 1996p).

The coyote, kit fox (*Vulpes macrotis*), badger, and bobcat are predators in the desert shrubland and grassland habitats. The mountain lion (*Puma concolor*) was observed in the Sacramento Mountains foothills and along the Otero Mesa escarpment in 1979 (Smartt, 1980) and in Rough Canyon along the Otero Mesa escarpment in 1996 (U.S. Army, 1997j).

The kit fox on McGregor Range is morphologically indistinguishable from its close relative the swift fox (*Vulpes velox)*; McGregor Range is within the area where the ranges of these two species overlap. Genetic studies are currently underway to determine which species or hybrid species occurs on McGregor Range (U.S. Army, 1996p). In 1994 and 1995, 20 kit fox were captured and the average home range size based on radio telemetry was 795 acres in 1994 and 1,390 acres in 1995. During the study, 10 animals died and the cause of death for 3 was a mammalian predator (probably coyote) and the remaining were

unknown; coyote tracks were observed around all carcasses. Coyotes have been reported as a major predator on the closely related swift fox. The largest number of kit fox dens were in the creosotebush habitat followed by grassland/tarbush and mesquite. Arthropods comprised the largest percent of the diet followed by mammals. The highest density of arthropods was sampled in the mesquite and sandsage/saltbush dune plant communities (U.S. Army, 1996p). Although the population densities of the coyote and kit fox on McGregor Range are not known, the coyote appears to be more common based on the collections of 1,812 canid scats during surveys of 1,525 miles of roads. Coyote scats were 2.2 and 3.6 times more common than foxes during 1994 and 1995 respectively (U.S. Army, 1996p).

The mule deer (*Odocoileus hemionus*) occurs throughout McGregor Range and is most common in the Sacramento Mountains foothills. Surveys in the Sacramento Mountains foothills on McGregor Range have occurred almost annually, and from 1983 through 1995 the number of deer ranged from a high of 587 in 1984 to a low of 206 in 1995 (Table D.3-15) (NMDGF, 1997). During this period, there has been a general decline in the mule deer population. The average number from 1983 through 1987 was 458 while the average number between 1989 and 1995 was 276. During the 1987 and 1992 surveys, the number observed north and south of New Mexico Highway 506 was determined and 79 and 90 percent of the deer recorded were north of New Mexico Highway 506 respectively. This indicates that the mule deer is more common in the Sacramento Mountains foothills than in the grasslands and shrublands to the south.

Table D.3-15. Mule Deer Census Data from the Sacramento Mountains Foothills (North of New Mexico Highway 506) and the Otero Mesa Grasslands and Desert Shrublands (South of New Mexico Highway 506) on McGregor Range, Otero County, New Mexico

Year	*Number of Mule Deer*		*Total*
	North of New Mexico Highway 506	*South of New Mexico Highway 506*	
1983	544	—	*544*
1984	587	—	*587*
1985	308	—	*308*
1986	442	—	*442*
1987	323	87	*410*
1988	226	—	*226*
1989	222	—	*222*
1990	350	—	*350*
1991	319	33	*352*
1992	249	—	*249*
1993	No Survey	No Survey	*No Survey*
1994	No Survey	No Survey	*No Survey*
1995	206	—	*206*

NOTE: "–" = Survey data not provided for below New Mexico Highway 506.
Source: NMDGF, 1997.

The pronghorn antelope (*Antilocapra americana*) occurs mostly in the grassland communities of the Otero Mesa and adjoining grasslands below the mesa. Pronghorns occasionally use the desert shrubland habitat in the Tularosa Basin on McGregor Range. An estimated 500 to 700 pronghorn inhabit the Otero Mesa of Fort Bliss. The oryx (*Oryx gazella)* is fairly common in the desert shrubland communities and was observed in the area of Mack Tanks in the Tularosa Basin while sign was common at New Tank in the Hueco Mountains (USAF, 1997g; U.S. Army, 1997h). The javelina (*Dicotyles tajacu*) is uncommon

on Fort Bliss and observations include one animal in an arroyo about 3 miles east of Hay Meadow Tank and sign about one mile east of Martin Canyon (USAF, 1997e, f).

D.4 SENSITIVE SPECIES

Various species of flora and fauna occur on McGregor Range that are listed as threatened, endangered, or species of concern by the USFWS and the State of New Mexico (sensitive species) (Table D.4-1). In addition, the diverse habitats on McGregor Range have the potential to support species that have not been confirmed. The following sections present brief summaries of selected sensitive species known to occur or have the potential to occur on McGregor Range. In addition, federally listed species will be addressed in greater detail in a biological assessment that will be prepared separately. The draft biological assessment is scheduled to be completed in 1999.

D.4.1 Plants

Sneed Pincushion Cactus. The Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii)* is a federally endangered species and is also considered endangered in New Mexico. This species is known only from limestone substrates in the Franklin Mountains in El Paso County, Texas, and Doña Ana County, New Mexico (U.S. Army, 1980b). Surveys for this species were conducted in the Hueco Mountains in Texas in seemingly good habitat and none were observed (U.S. Army, 1991a). Additional surveys for this species were conducted in 1997 in appropriate habitat and two additional populations were found on the Doña Ana Range (U.S. Army, 1998k).

Alamo Beardtongue. The alamo beardtongue (*Penstemon alamosensis)* is a federal species of special concern and a rare and sensitive species in New Mexico. This species is known from the Sacramento and San Andres mountains, and was discovered in the Hueco Mountains in Texas on Fort Bliss in 1981 (U.S. Army, 1991a). Surveys in 1991 revealed that this species was growing on rocky canyon bottoms and on cliffs in two canyons in the Hueco Mountains in Texas; a total of 105 plants were observed (U.S. Army, 1991a). A follow-up survey for this species was conducted in 1997 in ten canyons in the Hueco Mountains in Texas; it was only observed in previously recorded locations (U.S. Army, 1998j). This species has not been observed on McGregor Range, although limited potential habitat occur on the range.

Grama-grass Cactus. The grama-grass cactus (*Toumeya papyracantha*) is a federal species of special concern and is not listed by the State of New Mexico. Prior to 1995, it was considered endangered by the state but is now listed as L4, which indicates that the species was once listed but is no longer because it is more common than originally thought. Prior to 1992, there were only two records for this species from McGregor Range; both were in the grasslands of Otero Mesa. Surveys in 1993 and 1994 showed that this species was much more abundant in the grassland habitat on McGregor Range. This species is considered common on Otero Mesa (Corral, 1997).

Night Blooming Cereus. The night blooming cereus (*Peniocereus greggii)* is a federal species of special concern and a rare and sensitive species in New Mexico. This species occurs in the Chihuahuan Desert shrubland and is known to occur on Fort Bliss. Seven of these plants were located during a survey on the Doña Ana Range–North Training Areas (U.S. Army, 1990). No additional populations of this species were observed during 1997 surveys on McGregor Range in a 5,000-acre area in the Tularosa Basin below the Otero Mesa escarpment (USAF, 1997g), or in locations surveyed on Doña Ana Range–North Training Areas (U.S. Army, 1998k). This species has not been observed on McGregor Range, although limited potential habitat occur on the range.

Table D.4-1. Sensitive Species Known to or Having the Potential to Occur on McGregor Range

Species	*Status*[a]		*Location*
	Federal	*New Mexico*	
Plants			
Sneed pincushion cactus *(Coryphantha sneedii var. sneedii)*	E	E	Limestone Hills, Doña Ana Range–North Training Areas
Alamo beardtongue *(Penstemon alamosensis)*	SC	RS	Hueco Mountains, South Training Areas
Grama grass cactus *(Toumeya papyracantha)*	SC	—	Otero Mesa, McGregor Range
Night blooming cereus *(Peniocereus greggii)*	SC	RS	Desert shrublands, Doña Ana Range–North Training Areas
Hueco Mountain rock daisy *(Perityle huecoensis)*	SC	—	Hueco Mountains, South Training Areas
Nodding cliff daisy *(Perityle cernua)*	SC	RS	Organ Mountains, Doña Ana Range–North Training Areas
Sand prickly pear (*Opuntia arenaria*)	SC	E	Low potential to occur on McGregor Range
Invertebrates [b]			
Los Olmos tiger beetle (*Cicindela nevadica*)	SC	—	Not known to occur on Fort Bliss. Could occur in areas of limestone soil
Reptiles			
Texas horned lizard *(Phrynosoma cornutum)*	SC	—	Widespread throughout post
Mountain short-horned lizard (*Phrynosoma douglasii hernandezii*)	—	—	Species occur on McGregor Range; subspecies not recorded on post
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)	—	T	Species documented from the Organ Mountains; subspecies not recorded on post
Birds			
Interior least tern *(Sterna antillarum athalassos)*	E	E	Not known to occur on Fort Bliss. Could occur as very rare migrant at aquatic habitat on McGregor Range
Peregrine falcon *(Falco peregrinus anatum)*	E	T	Occasional migrants observed on McGregor Range
Northern aplomado falcon *(Falco femoralis septentrionalis)*	E	E	One unconfirmed sighting, best potential habitat on Otero Mesa McGregor Range
Southwestern willow flycatcher *(Empidonax trailii extimus)*	E	E	Willow flycatcher subspecies on McGregor Range not determined. Occasional migrant on McGregor Range
Bald eagle *(Haliaeetus leucocephalus)*	T	T	Winters in Sacramento Mountains foothills, McGregor Range
Piping plover *(Charadrius melodus)*	T	E	Rare migrant on McGregor Range; observed once in 1987 at sewage lagoon on Fort Bliss
Mexican spotted owl *(Strix occidentalis lucida)*	T	—	Very rare on Fort Bliss. Not known to breed on site, best potential habitat in Organ Mountains, Doña Ana Range–North Training Areas. Marginal habitat in Sacramento Mountains foothills on McGregor Range
Mountain plover *(Charadrius montanus)*	PT	—	Has the potential to occur in grassland habitat on Otero Mesaon McGregor Range
Black tern *(Chlidonias niger)*	SC	—	Regular migrant through McGregor Range at perennial water sources

Table D.4-1. Sensitive Species Known to or Having the Potential to Occur on McGregor Range (Continued)

Species	*Status*[a]		*Location on McGregor Range*
	Federal	*New Mexico*	
White-faced ibis *(Plegadis chihi)*	SC	—	Regular migrant through Fort Bliss; observed at sewage lagoons and on cantonment on Fort Bliss. Could occur at aquatic habitat on McGregor Range
Northern goshawk (*Accipiter gentilis*)	SC	—	Uncommon migrant on McGregor Range
Ferruginous hawk *(Buteo regalis)*	SC	—	Wintering and migrant species; mostly on Otero Mesa, McGregor Range
Western burrowing owl *(Athene cunicularia)*	SC	—	Occurs throughout McGregor Range except the mountain areas. Most common at prairie-dog towns in the grassland habitat on Otero Mesa
Costa's hummingbird (*Calypte costae*)	—	T	Uncommon migrant in arroyo-riparian habitat on McGregor Range
Loggerhead shrike *(Lanius ludovicianus)*	SC	—	Winter and breeding bird from Otero Mesa and Tularosa Basin on McGregor Range
Baird's sparrow *(Ammodramus bairdii)*	SC	T	Migrates through and winters in dense grasslands on McGregor Range
Varied bunting *(Passerina versicolor)*	—	T	Very rare on Fort Bliss; occasional migrant on McGregor Range
Bell's vireo *(Vireo bellii)*	—	T	Occasional on McGregor Range
Gray vireo *(Vireo vicinior)*	—	T	Nests in the Organ Mountains, Doña Ana Range–North Training Areas. May occur on McGregor Range
Mammals			
Eastern small-footed bat *(Myotis leibii)*	SC	—	Distribution unknown
Occult little brown bat *(Myotis lucifugus occultus)*	SC	—	Distribution unknown
Fringed myotis *(Myotis thysanodes)*	SC		Reported from the Sacramento Mountains foothills, McGregor Range
Cave myotis *(Myotis velifera)*	SC	—	Distribution unknown
Long-legged myotis *(Myotis volans)*	SC	—	Distribution unknown
Yuma myotis *(Myotis yumanensis)*	SC	—	Distribution unknown
Spotted bat *(Euderma maculatum)*	SC	T	Distribution unknown
Townsend's pale big-eared bat *(Corynorhinus townsendii)*	SC	—	Distribution unknown
Big free-tailed bat *(Nyctinomops macrotis)*	SC	—	Distribution unknown
Gray-footed chipmunk *(Tamias canipes)*	SC	T	Occurs in woodland and forest habitats in the Sacramento Mountains foothills on McGregor Range
Arizona black-tailed prairie dog *(Cynomys ludovicianus arizonensis)*	SC	—	Occurs on Otero Mesa , McGregor Range

[a] RS = rare and sensitive species, SC = federal species of concern, E = endangered species, PT = proposed threatened, T = threatened species, — = not listed.

[b] No federal or state status but are globally imperiled (U.S. Army, 1994b).

Source: NMDGF, 1996; Sivinski and Lightfoot, 1995; TPW, 1996; U.S. Army, 1998b.

Hueco Mountain Rock Daisy. The Hueco Mountain rock daisy (*Perityle huecoensis)* is a federal species of special concern. This species was first collected in 1977. Surveys of the Hueco Mountains in Texas in 1991 revealed the presence of three populations of this species. The only known populations of this species are within the South Training Areas of Fort Bliss. It occurs on north facing slopes or on slopes protected from direct sunlight in relatively mesic canyons in these mountains (U.S. Army, 1991a). A 1997 follow-up survey in ten canyons in the Hueco Mountains in Texas showed that this species occurred only in the areas where it was previously observed (U.S. Army, 1998k). This species has not been observed on McGregor Range, although limited potential habitat occur on the range.

Sand Prickly Pear. The sand prickly pear (*Opuntia arenaria)* is a federal species of special concern and a State of New Mexico endangered species. This is a "cholla-type" cactus that typically stands less than 1 foot high but can form clumps up to 5 feet in diameter. The sand prickly pear grows in sandy dunes, flood plains, and foothills in the Rio Grande corridor between Las Cruces, New Mexico, and El Paso, Texas (USFWS, 1997). In 1988, a small population of sand prickly pear was discovered 0.8 mile from the western boundary of the Doña Ana Range–North Training Areas on BLM land. It was found in the mesquite coppice dune plant community with sparse grass cover. In December 1996, a 2-day survey for this species in potential habitat on the Doña Ana Range–North Training Areas took place in mesquite coppice dune plant community in proximity to the known population on BLM land. No populations of the sand prickly pear were found on Fort Bliss although there appears to be suitable habitat. However, extensive on-going vegetation surveys have taken place at numerous locations on Fort Bliss and this species has never been recorded. The mesquite coppice dunes surveyed on Fort Bliss had more grass cover than similar habitat on BLM land which may detract from the suitability of this habitat for the sand prickly pear (U.S. Army, 1998j). In addition, most known populations in the U.S, are in mesquite sand dunes in the vicinity of the Rio Grande, well away from Fort Bliss. Therefore, the probability of this species occurring on Fort Bliss is very low.

D.4.2 Invertebrates

Los Olmos Tiger Beetle. The Los Olmas tiger beetle (*Cicindela nevadica)* is a federal species of concern and is not listed by the State of New Mexico. This species has not been recorded from McGregor Range. The population trend of this species is unknown and it is listed as a possible species for New Mexico (BISON-M, 1997). The Los Olmos tiger beetle occurs in limestone soils often down slope from limestone rubble. It has the potential to occur in areas of limestone soil on Fort Bliss.

D.4.3 Reptiles

Texas Horned Lizard. The Texas horned lizard (*Phrynosoma cornutum)* is a federal species of special concern and is not listed in New Mexico. This species is common and widespread on McGregor Range and is found in grassland and desert shrublands habitat throughout the area (U.S. Army, 1997e). This species was captured 82 times at 20 sampling locations in the desert shrublands of the Tularosa Basin on McGregor Range. This represents less then 1 percent of the total captures during this study (U.S. Army, 1996e).

Mottled Rock Rattlesnake. The mottled rock rattlesnake (*Crotalus lepidus lepidus)* is a State of New Mexico threatened species; it is not listed by the Federal Government. It is typically found in rocky canyons or hillsides and in New Mexico is known only from the Guadeloupe Mountains in Eddy County and extreme eastern Otero County (Degenhardt et al., 1996). The mottled rock rattlesnake has not been documented from Fort Bliss although it has been recorded from the Organ Mountains near the post. Potential habitat occurs in the Hueco Mountains as well as the Otero Mesa escarpment on McGregor Range.

D.4.4 Birds

Interior Least Tern. The interior least tern (*Sterna antillarum athalassos*) was listed as an endangered species in 1985 (USFWS, 1990) and is also endangered in New Mexico. The California *(S. a brownii)* and eastern subspecies *(S. a. antillarum)* occur along the coasts of the U.S. and the interior least tern occurs principally along the Missouri and Mississippi River systems in the U.S. although some nest along the Rio Grande drainage in the western U.S. (Whitman, 1988). Historically, the interior least tern was abundant along the Missouri and Mississippi river systems; the estimated population in 1990 was 5,000 birds, which is much reduced from historic population levels (USFWS, 1990).

Whitman (1988) summarized the biology of the interior least tern and factors that have lead to the reduction of this species include habitat destruction caused by urbanization; construction of locks, dams, dikes, levees, and storage reservoirs; altered flow patterns in rivers resulting in the disappearance of sandbar nesting habitat; increased predation in disturbed habitats; human disturbance; and water pollution. The interior least tern has been eliminated from the Mississippi River and its tributaries north of the Missouri River junction due to habitat destruction (USFWS, 1990). In other areas where nesting habitat still exists along the river, predation can be the major cause in chick mortality (Kirsch, 1996).

Before human development, the interior least tern nested on sandbars along low gradient portions of major rivers such as the Mississippi and the Missouri. With the disappearance of this habitat, this species now also nests on man-made areas such as dikes, dredge material islands, sand pit mines, construction fill sites, and on roofs of buildings (Gore and Kinnison, 1991; Whitman, 1988). Kirsch (1996) studied nesting least terns on sandbar and sandpit sites along the lower Platte River in Nebraska and determined that the proportion of terns using each habitat was similar to the proportion of bare sand in each habitat. In addition, productivity did not differ between the natural sandbars and the sandpit areas. However, Kirsch (1996) determined that the estimated productivity during the 4-year study was insufficient to support the local population and that high chick mortality was he reason why. Smith and Renken (1991) studied nesting interior least terns along the Mississippi River where this species nests on sandbars. There was no difference between used and unused sandbars except that most terns nested on sandbars that were continuously exposed for at least 100 days during the breeding season.

In New Mexico, the interior least tern nests at Bitter Lake National Wildlife Refuge on the Pecos River Drainage in Chaves County (Whitman, 1988). In the 1960s, the breeding tern population was about 60; this number declined to only three nesting pairs per year from 1987 through 1990. There has been a slight increase of four to seven pairs per year from 1991 through 1995. Productivity has been poor during the last 10 years (NMDGF, 1997). The interior least tern has not been observed on McGregor Range. If it did occur, it would likely be only during migration near aquatic habitat.

Peregrine Falcon. The peregrine falcon (*Falco peregrinus anatum*) is a federal endangered species; it is threatened in New Mexico. Nesting peregrine falcons have been monitored extensively in New Mexico from 1979 through 1996 and less extensive monitoring data is available from 1960 to 1979 (Johnson, 1996). Long-term data indicate that adult pairs of peregrine falcons occupied about 85 percent of known territories in the early 1960s; this number decreased to below 40 percent beginning in the late 1960s. The number of adult pairs at known territories fluctuated around 40 percent until about 1985. Since 1985, the number of adult pairs occupying territories has steadily increased and has averaged 70 percent from 1992 through 1996. The increase in number of adult pairs occupying territories since 1985 is the result of increased productivity in the early 1980s. However, productivity has decreased 29 percent in the last 10 years and if this trend continues, the peregrine falcon population in New Mexico may start to decrease (Johnson, 1996).

The peregrine falcon has not been recorded as a breeding species at Fort Bliss although an unconfirmed peregrine/prairie falcon and a prairie falcon made a nesting attempt on the Otero Mesa escarpment in

1997 (USAF, 1997c, d). A survey for potential peregrine falcon nesting habitat was conducted during the fall of 1979 and it was determined that the large cliffs, intermittent stream flow, and the mosaic of conifer forest and mountain shrub habitat that occurred in some of the canyons of the Organ Mountains on Doña Ana Range–North Training Areas represented the best potential habitat for this species on Fort Bliss. This survey also included the Sacramento Mountains foothills on McGregor Range and it was determined that the potential habitat in this area was inferior to the Organ Mountains because of the lack of perennial water and the much drier nature of the area (U.S. Army, 1980a).

Ten canyons were intensively surveyed for peregrine falcons in the Organ Mountains in 1980. No peregrine falcons were observed during this study, although four prairie falcon and three golden eagle nest sites were found. It is believed that the relatively high density of prairie falcons and golden eagles may preclude the use of these mountains for nesting peregrine falcons (U.S. Army, 1980a). A 6.2-mile section of cliffs in the Sacramento Mountains foothills on McGregor Range was also searched for peregrine falcons and none were found. One prairie falcon nest site was found just north of the McGregor Range boundary (U.S. Army, 1980a). Single peregrine falcons were observed in the Tularosa Basin of McGregor Range in February and April 1996 during aplomado falcon surveys (U.S. Army, 1997k) and one was observed flying over mesquite habitat on McGregor Range in the spring of 1996 (U.S. Army, 1996k). This species was also observed flying over the sandsage habitat in the Tularosa Basin on McGregor Range on April 25,1997 (U.S. Army, 1997f). These observations indicate that the peregrine falcon may occur occasionally during the winter and as a migrant on McGregor Range.

Northern Aplomado Falcon. The northern aplomado falcon (*Falco femoralis septentrionalis)* is a federal and State of New Mexico endangered species. It once inhabited the grasslands of southern Texas, New Mexico, and Arizona; historic records show that it was common until about 1940 (Hector, 1987). Historic records from New Mexico show that this species occupied open yucca grasslands in southern New Mexico (Ligon, 1961) which includes the grasslands of Otero Mesa on McGregor Range. The reasons for this species' decline are unclear. Habitat loss and pesticide contamination likely contributed to this decline (Hector, 1987). The USFWS is currently releasing aplomado falcons into the wild in south Texas in an attempt to re-establish a breeding population in the United States. The first nesting pair of aplomado falcons was recorded in Cameron County, Texas, in 1995, which represents the first nesting aplomado falcons in Texas in the last 54 years. Two nesting pairs were observed in 1996 (Mora et al., 1997).

Sporadic observations of the northern aplomado falcon have been reported since 1991 in areas near McGregor Range. An unconfirmed sighting of this species on McGregor Range occurred in May 1997 when an immature bird was observed in the desert shrubland-grassland habitat in the Tularosa Basin (USAF, 1997d). In 1992, breeding populations were discovered south of the border in grassland habitat in the State of Chihuahua, Mexico. The nearest population to the United States is about 125 miles south of the New Mexico border (Montoya et al., 1997). Given the recent sighting of this species near McGregor Range and the existence of potential grassland habitat on Otero Mesa, surveys for this species were conducted in 1994 and 1996 on McGregor Range (U.S. Army, 1994b, 1997k). In 1994, 495 miles of survey routes were traversed over 23 days from February 2 through April 21. No northern aplomado falcons were observed although 13 other species of raptors were noted and the location of 30 nest structures were mapped (U.S. Army, 1994b). Based on these surveys, potential habitat for the northern aplomado falcon was mapped on Otero Mesa and part of the Tularosa Basin below the mesa. Potential excellent habitat consists of areas with an interspersion of open grassland and tall yucca and shrubs such as mesquite and Mormon tea. As the cover of shrubs increases, the suitability of the habitat for northern aplomado falcon decreases. The best potential habitat occurs in the grassland habitat on Otero Mesa and in a portion of the Tularosa Basin.

In 1996, the northern aplomado falcon survey was expanded to include habitat evaluation and avian prey base studies on Fort Bliss (U.S. Army, 1997k). Results of this study were compared to similar habitat and

prey base assessments conducted at occupied aplomado falcon territories in Chihuahua, Mexico (Montoya et al., 1997). Late February/March/April 1996 surveys for the northern aplomado falcon took place along six routes in marginal potential habitat in the Tularosa Basin and along six routes in marginal-to-good and good-to-excellent habitat on Otero Mesa; surveys followed the USFWS draft protocol (USFWS, 1996). No northern aplomado falcons were observed during these surveys (U.S. Army, 1997k).

Habitat and prey-base study results for McGregor Range showed some similarities and differences when compared to equivalent studies in Chihuahua, Mexico. The grasslands on Otero Mesa with its scattered yuccas and shrubs resemble the open habitat considered necessary to support a breeding population of northern aplomado falcons. Scattered woody plants provide the necessary perch and nesting sites for this species and the density of woody species on more than one-half the sites sampled on some portions of Otero Mesa is similar to that found in occupied territories in Mexico. The eight sites sampled in the Tularosa Basin had shrub densities much higher than on Otero Mesa or in Mexico. The northern aplomado falcon does not construct its own nest but uses abandoned nests built by hawks and ravens. Adequate potential nest sites were observed during the northern aplomado falcon survey on Otero Mesa in 1996. It is believed, therefore, that the number of woody species and potential nest sites would be adequate to support northern aplomado falcons on Otero Mesa (U.S. Army, 1997k). The Otero Mesa-1 habitat group consists of seven locations on Otero Mesa that were most similar to data from Mexico, and the Otero Mesa-2 habitat group represents eight locations that were somewhat less similar to data from Mexico (Table D.4-2). Comparison of percent grass cover and biomass of potential prey species showed that both were much less on Otero Mesa than in Mexico (Table D.4-2). Mean basal grass cover in two areas on Otero Mesa that provide the best potential northern aplomado falcon habitat ranged from 16.0 to 20.1 percent; cover at occupied territories in Mexico averaged 46.3 percent (Table D.4-2) (U.S. Army, 1997k; Montoya et al., 1997). Although such factors as differences in precipitation patterns and soil type may contribute to the observed differences between Otero Mesa and Mexico, it is believed that livestock grazing has had a greater impact on the grasslands on Otero Mesa than in Mexico. The number of birds detected at sampling locations on Otero Mesa and in Mexico were similar but the bird biomass in Mexico was substantially greater than on Otero Mesa (Table D.4-2). Higher densities of meadowlarks in Mexico account for this difference and meadowlarks were the most common prey item in the diet of northern aplomado falcons in Mexico (Montoya et al., 1997). These results indicate that the grassland habitat on Otero Mesa may have a reduced capacity to support northern aplomado falcons compared to occupied territories in Mexico and that the principal reason for this may be livestock grazing. However, further study is necessary, before a more definitive determination of northern aplomado falcon habitat and food requirements can be made (U.S. Army, 1997k).

Table D.4-2. Mean Percent of Grass Cover and Mean Number of Birds and Bird Biomass Per Site at Two Locations on Otero Mesa and at Occupied Aplomado Territories in Mexico

Habitat	*Number of Transects*	*Average Percent Grass Basal Cover*	*Potential Avian Prey*	
			Average Number of Birds	*Average Biomass of Birds (grams per site)*
Otero Mesa - 1	7	20.1 (± 2.11)[a]	13.0 (± 5.4)	507.8 (± 230.7)
Otero Mesa – 2	8	16.0 (± 2.42)	14.8 (± 5.5)	594.9 (± 222.5)
Mexico	10	46.3 (± 13.0)	12.1 (± 4.2)	816.8 (± 188.7)

[a] Numbers in parenthesis are standard deviations.
Source: U.S. Army, 1997k; Montoya, 1995; Montoya et al., 1997.

Southwestern Willow Flycatcher. The southwestern willow flycatcher (*Empidonax traillii extimus)* is a federal and State of New Mexico endangered species. This flycatcher is a neotropical migrant that breeds

in the southwestern U.S. and winters in Central and South America. The southwestern willow flycatcher breeds only in dense riparian vegetation near surface water or saturated soil in linear or irregularly shaped stands with patches of dense vegetation interspersed with small openings (Sferra et al., 1997; Sogge et al., 1997).

The southwestern willow flycatcher populations have experienced significant declines, and breeding populations are known from only about 75 locations. There are an estimated 300 to 500 pairs in existence (Sogge et al., 1997). The principal factors resulting in these declines are the extensive loss, modification, and fragmentation of riparian breeding habitat and brood parasitism by brown-headed cowbirds (Sogge et al., 1997). Based on recent surveys, there are likely less then 200 breeding pairs of southwestern willow flycatchers in New Mexico (Williams, 1997).

The willow flycatcher has been recorded occasionally on McGregor Range. Willow flycatchers were heard singing in an arroyo on McGregor Range in early June 1996. These birds were apparently migrants because they did not stay in the area (U.S. Army, 1997k). This species has also been recorded in arroyos during breeding bird surveys in 1996 and 1997 (U.S. Army, 1996i, 1997g). These birds are assumed to be migrants. The subspecies of willow flycatchers observed on McGregor Range was not determined, so it is not known if these observations represent the endangered southwestern willow flycatcher. Appropriate nesting habitat for the southwestern willow flycatcher does not exist on McGregor Range. There are stands of willow (*Salix* sp.) at some stock tanks but these stands are likely too small to support nesting southwestern willow flycatchers. For example, a stand of willow exists at Mack Tanks in the Tularosa Basin. This tank typically holds water all year and the stand of willows covers about 0.4 acre (USAF, 1997h), which is assumed to be too small to support nesting willow flycatchers. Therefore, it is assumed that the willow flycatchers that occur on McGregor Range are migrants.

Bald Eagle. The bald eagle *(Haliaeetus leucocephalus)* is a federal and State of New Mexico threatened species. It winters along lakes and rivers in large numbers (Spencer, 1976; Steenhof et al., 1980) and also in terrestrial habitat far from aquatic habitat (Fischer et al., 1984; Grubb and Kennedy, 1982; Grubb et al., 1989). A small population (25 to 30 individuals) of bald eagles winter in the Sacramento Mountains and one of the known roost sites is about 4 miles from the northern border of McGregor Range (U.S. Army, 1995d). Given that bald eagles are known to travel up to 22 miles from roost sites to feeding sites (Grubb et al., 1989), the northern portion of McGregor Range is within the range of eagles roosting in the Sacramento Mountains.

Surveys for wintering bald eagles in the Sacramento Mountains foothills on McGregor Range were conducted during the winters of 1994-95 and 1995-96 (U.S. Army, 1995d, 1996i) (see Table D.3-8). Two routes were surveyed in the wooded habitat of the foothills; one in the desert shrubland habitat, and one in the grassland habitat on Otero Mesa. During the winters of 1994-95 and 1995-96, bald eagles were observed 28 and 14 times, respectively, on McGregor Range (U.S. Army, 1995d, 1996i). Based on plumage characteristics, it was estimated that a minimum of five different eagles were in the study area during the winter of 1994-95. During both winters, most bald eagles were observed at the extreme northern boundary of McGregor Range, where high ridges and hills provide favorable perch sites and updrafts. Vegetation in this area is mainly grassland with varying amounts of shrubs (mountain mahogany and oak) and trees (pinyon pine and juniper) providing favorable foraging conditions (U.S. Army, 1995d). Only two bald eagles were observed over the grasslands of Otero Mesa. Most birds were in flight when first observed. In seven cases, bald and golden eagles were observed together; in three of these, golden eagles initiated aggressive interactions with bald eagles. There were no observations of eagles feeding or hunting. Food sources on Fort Bliss may include deer carrion and rabbits.

Piping Plover. The piping plover (*Charadrius melodus)* is an endangered species in the Great Lakes region and threatened elsewhere in the U.S. This species is considered endangered by the State of New Mexico. The piping plover has experienced range-wide declines (Haig and Oring, 1985) and the principal factors are habitat deterioration (Haig and Oring, 1985), human disturbance (Flemming et al., 1988), and

predation (Gaines and Ryan, 1988). The piping plover nests on beaches along the Atlantic coast and Great Lakes, and along lakes and rivers in the great plains in Canada and the U.S. (Haig and Oring, 1985). New Mexico is south of the piping plover breeding range. This species is a very rare migrant in New Mexico, having been observed six times (NMDGF, 1996).

The piping plover was observed once on Fort Bliss at sewage lagoons in 1987 (U.S. Army, 1997k) and is therefore considered a very rare migrant on Fort Bliss, including McGregor Range.

Mexican Spotted Owl. The Mexican spotted owl (*Strix occidentalis lucida)* is a federal threatened species and is not listed by New Mexico. Its range includes southern New Mexico where it occurs in suitable habitat in isolated mountain ranges (U.S. Army, 1996j). During the breeding season, the Mexican spotted owl inhabits mountain forests and canyons, and the most commonly used habitat types for nesting and roosting are mixed conifer (Douglas fir, white fir [*Abies concolor*], southwestern white pine [*Pinus strobiformis*], and ponderosa pine), while pinyon pine-juniper forests are used to a lesser degree (Skaggs and Raitt, 1988; Ganey and Balda, 1989; Zwank et al., 1995). The Sacramento Mountains just to the north of McGregor Range contain a breeding population of Mexican spotted owls, and the closest known breeding pair is 10 miles from the McGregor Range boundary (U.S. Army, 1996j).

The Mexican spotted owl has been observed on or near McGregor Range on two occasions. During the winter of 1989-90, one bird was found dead and the second moved out of the Sacramento Mountains to McGregor Range and then back into the mountians. Both birds were being followed by radio-telemetry (U.S. Army, 1996j). Surveys for this species were conducted in the Sacramento Mountains foothills on McGregor Range from December 12, 1995, to February 21, 1996. No spotted owls were heard or observed during these surveys (U.S. Army, 1996j). No mixed conifer habitat and only a few isolated ponderosa pine occur in the Sacramento Mountains foothills. Based on the habitat in the Sacramento Mountains foothills on McGregor Range and the ecology of the spotted owl, it seems likely that this area is only used by spotted owls on an occasional basis during the winter or fall dispersal (U.S. Army, 1996j).

Mountain Plover. The mountain plover (*Charadrius montanus)* is a proposed threatened species, is not listed by New Mexico, and has declined by 63 percent since 1966 (Knopf, 1994). This species is generally considered an associate of the short grass prairie dominated by blue grama and buffalo grass (*Buchloe dactyloides)* (Knopf and Miller, 1994) although it is known to nest in habitat dominated by low growing shrubs such as sagebrush (*Artemesia* sp.) and rabbitbrush (*Chryosthamnus* sp.) (Day, 1994). Various observers have noted that the mountain plover nests and forages in areas of disturbed ground in Utah, such as that which occurs at prairie-dog towns and areas heavily grazed by livestock (Knopf and Miller, 1994; Miller and Knopf, 1993; Sager, 1996). The bulk of the mountain plover population winters in the central valley of California and seems to have adapted to the conversion of much of the native habitat to agricultural fields in that area. The survival rate of mountain plovers on their wintering ground is high, so it appears that the declines noted for this species are attributable to factors on the breeding grounds (Knopf and Rupert, 1995).

In a recent survey, the mountain plover was observed at 35 sites in 11 counties during the breeding season in New Mexico. This species was observed in a variety of habitats, but bare ground was a common feature at all the sites and livestock grazing had created most of the bare ground. The bulk of the observations were in the northeast part of the state and none were from Otero County although there are two historic records of this species from Otero County (Sager, 1996). Based on its habitat requirements, Otero Mesa on McGregor Range provides the best potential habitat for this species, especially in the overgrazed areas around stock tanks and troughs. The mountain plover was not recorded during field surveys for this species in the 5,000-acre USAF proposed tactical target complex site in the grassland habitat on Otero Mesa or in grassland habitat in a second proposed tactical target complex site in the Tularosa Basin (USAF, 1997h, i). This species was also not recorded during surveys of other potential habitat in a 13,000-acre section

of Otero Mesa, such as along roads, at heavily grazed stock tanks, or prairie dog *(Cynomys ludovicianus arizonensis)* towns (U.S. Army, 1998k). However, one Mountain plover was observed at Mesa Horse Camp on Otero Mesa on April 4 and 6, 1999. This bird was not observed during subsequent observations and was assumed to be a migrating bird (Locke, 1999).

Black Tern. The black tern (*Chlidonias niger*) is a federal species of special concern and is not listed by the State of New Mexico. This species breeds in wetlands greater than 12 acres in size in the central and western U.S. Breeding bird studies have shown that this species is declining range-wide at 8.1 percent per year; these declines include the populations in the central and western U.S. (Finch, 1992).

The black tern has been observed on Fort Bliss during migration at playa lakes, ponds, and man-made water resources in the Tularosa Basin and on Otero Mesa. This species is likely a regularly occurring migrant on Fort Bliss including McGregor Range (U.S. Army, 1997k).

White-faced Ibis. The white-faced ibis (*Plegadis chihi*) is a federal species of special concern and is not listed by the State of New Mexico. This species nests in colonies in large fresh water marshes from California, east to Idaho and Wyoming. The current population is thought to be stable, but warrants protection because there are a limited number of breeding colonies and their disappearing wetlands habitat could be exposed to fluctuating water levels and pesticide poisoning (Finch, 1992).

The white-faced ibis has been observed on Fort Bliss during spring and fall migrations at sewage ponds. It could also occur during migration at playa lakes, stock tanks, and other water sources elsewhere on Fort Bliss including McGregor Range (U.S. Army, 1997k).

Northern Goshawk. The northern goshawk (*Accipiter gentilis)* is a federal species of concern and is not listed by New Mexico. This species is a rare migrant through McGregor Range. In the west, this species nests in mature conifer forests such as those dominated by Douglas fir and ponderosa pine (Call, 1978; Moore and Henny, 1983). The only potential nesting habitat for this species occurs in the Organ Mountains on the Doña Ana Range–North Training Areas. The northern goshawk has not been recorded from the Organ Mountains during raptor and breeding bird surveys and is assumed not to nest on Fort Bliss (U.S. Army, 1980a, 1991b, 1994b). On McGregor Range, this species may occasionally occur as a migrant in the Sacramento Mountains foothills.

Ferruginous Hawk. The ferruginous hawk *(Buteo regalis)* is a federal species of special concern and is not listed by the State of New Mexico. The hawks' decline in some areas is due to its intolerance to human disturbance and loss of habitat due to cultivation (White and Thurow, 1985; Houston and Bechard, 1984; Schmutz, 1984). It breeds from the Canadian provinces, south to Arizona and Oklahoma, and nests on trees, bushes, large rocks, and hillsides. It is a grassland species and typically feeds on prairie dogs and ground squirrels (Finch, 1992). Observations on McGregor Range confirm this because all but one ferruginous hawk, observed during wintering bald eagle surveys, were associated with the grassland habitat of Otero Mesa (U.S. Army, 1995d; 1996i).

The ferruginous hawk has been observed on McGregor Range during the fall, winter, and spring. This species was observed at prairie-dog towns on Otero Mesa three times in March of 1996 (U.S. Army, 1996k). During wintering bald eagle surveys, the ferruginous hawk was observed 21 times along nine survey routes from early December 1994 to late February 1995, and two times during 18 surveys in the winter of 1995-96 (U.S. Army, 1995d, 1996i). These observations indicate that the ferruginous hawk winters at and migrates through McGregor Range. This species is not known to nest on McGregor Range and was not observed during intensive breeding-bird surveys during 1996 and 1997 (U.S. Army, 1996g, 1997f), or during ferruginous hawk surveys conducted in April 1997 (U.S. Army, 1998i).

Burrowing Owl. The western burrowing owl is a federal species of concern and is not listed in New Mexico. This species nests in desert grasslands such as those that occur on Otero Mesa and desert shrublands such as those in the Tularosa Basin on McGregor Range. It also nests in prairie, mesquite coppice dune/sand scrub, basin, mesa foothill grasslands, desert shrublands, sagebrush, and pinyon/juniper habitat, as well as, disturbed areas such as prairie-dog towns, road cuts, airports, and other developed areas. Declines in this species are attributed to the loss of burrow nest sites resulting from the eradication of colonial burrowing rodents, particularly prairie dogs (Finch, 1992).

The burrowing owl was observed at 20 of the active and inactive prairie dog towns surveyed on Otero Mesa in 1996 (U.S. Army, 1996k). Burrowing owls were observed at nine of 16 prairie dog towns during a 1997 black-tailed prairie dog survey; young owls were observed at most of these towns. Field studies in 1997 showed that there were 18 to 22 pairs at 11 of 16 prairie-dog towns inspected on Otero Mesa on McGregor Range (U.S. Army, 1998k). All military facilities on McGregor Range were inspected in 1997, and 11 pairs of burrowing owls were observed nesting in concrete conduit boxes at radar tracking sites just east of McGregor Range Camp. Elsewhere in the Tularosa Basin, burrowing owls may occur occasionally in mesquite dunes habitat and along eroded arroyos. The extent of use of these habitat types in the desert shrublands habitat in the Tularosa Basin has not been determined (U.S. Army, 1998k). In 1997, one burrowing owl was repeatedly observed along a road in the Tularosa Basin between SHORAD and Mack Tanks; it was living in some kangaroo rat holes (USAF, 1997h).

Costa's Hummingbird. Costa's hummingbird (*Calypte costae)* is a threatened species in New Mexico; it is not listed by the Federal Government. This species occurs in arid habitats in the southwestern U.S. and northwestern Mexico. It typically occurs in extreme southwest New Mexico. In New Mexico, it is considered a warm season migrant and occasional breeder particularly in Guadalupe Canyon (NMDGF, 1996). This species has been observed in the Organ Mountains and is a nonbreeding migrant and it could occur on McGregor Range.

Loggerhead Shrike. The loggerhead shrike (*Lanius ludovicianus)* is a federal species of concern that breeds throughout much of New Mexico including McGregor Range. This species has declined over much of its range and is considered a threatened species in Canada and numerous states (Robert and Laporte, 1991). Breeding bird data from 1966 through 1995 show that this species has steadily declined throughout that period (Sauer et al., 1997). The reasons for the decline of this species in northern states is not clear. Robert and Laporte (1991) and Brooks and Temple (1990) have observed good nesting habitat in Canada and Minnesota that is currently not being used by this species. Brooks and Temple (1990) conclude that alteration of the shrikes' winter habitat in the Gulf Coast states may be partially responsible for the decline in this species.

The loggerhead shrike populations north of New Mexico migrate south to New Mexico, Texas, and Arizona to winter (Root, 1988). Loggerhead shrike presence on McGregor Range consists of wintering and resident birds. This species is fairly common in the desert habitat on McGregor Range during the breeding season; in 1996, 53 were recorded from 12 breeding bird sampling locations in the grasslands on Otero Mesa and Tularosa Basin, and 54 from 24 sampling locations in 4 desert shrubland habitats in the Tularosa Basin (U.S. Army, 1996g). In 1997, the number increased to 83 in the desert shrublands and 61 in the desert grasslands (U.S. Army, 1997f). The loggerhead shrike has also been recorded during breeding bird surveys from 1993 through 1997 in arroyo-riparian and upland habitats of the Tularosa Basin (Kozma, 1995; U.S. Army, 1995c, 1996h, 1997g). This species was also observed 19 times in the Tularosa Basin and 18 times from Otero Mesa during winter and spring 1996 surveys for the aplomado falcon (U.S. Army, 1997k). These results indicate that the loggerhead shrike is fairly common on McGregor Range, although there is no historic data to determine long-term trends. The long-term trend for the period 1968 through 1996 from breeding bird survey data in New Mexico, shows a decline throughout the period similar to that observed on a national scale (Sauer et al., 1997).

Baird's Sparrow. Baird's sparrow (*Ammodramus bairdii)* is a threatened species in Canada and population declines in the U.S. have been documented; it is a federal species of special concern and a threatened species in New Mexico (NMDGF, 1996). This species was once one of the most abundant nesting species in the northern prairie states and Canada. The species has declined in abundance by about 90 percent with cultivation and conversion of much of its mixed-grass prairie nesting habitat (DeSmet and Conrad, 1989). This species winters and migrates through New Mexico and the declines on the nesting grounds are evident in New Mexico. Although it was once relatively numerous and widespread in New Mexico, in recent years it has been very rarely reported (NMDGF, 1996).

Baird's sparrow was observed on McGregor Range during migration and is believed to winter on the Fort Bliss installation (Smartt, 1980; U.S. Army, 1998k). Surveys for this species were conducted at 28 sites on McGregor Range from late February to early April 1997, and it was observed 27 times. It was observed in the winter and an influx was noted in April, coinciding with spring migration. Preferred habitat on McGregor Range were swales on Otero Mesa with dense tall growth of tobosagrass along with black and blue grama grassland low shrub density. Bairds sparrows were not observed along swales that had been heavily grazed or had dense growth of tall grass such as dropseed (*Sporobolus* sp.) (U.S. Army, 1998k).

Varied Bunting. The varied bunting (*Passerina versicolor)* is a State of New Mexico threatened species and occurs primarily in Mexico. It occurs in southern New Mexico in Hidalgo and Eddy counties, was found nesting in Doña Ana County, and was observed in Otero County (NMDGF, 1996). The varied bunting nests in dense vegetation in arid canyons, and the loss of such habitat, is the principal threat to this species in New Mexico. Cowbird parasitism may also be a threat to this species (NMDGF, 1996).

This species is very rare on McGregor Range and is not a nesting species. The varied bunting was observed in an arroyo during breeding bird surveys in 1996 (U.S. Army, 1996k).

Bell's Vireo. Bell's vireo (*Vireo bellii)* is a State of New Mexico threatened species. In New Mexico, this species summers primarily in the Gila Valley, Guadalupe Canyon, and the lower Rio Grande and Pecos valleys (NMDGF, 1996). It nests in dense riparian vegetation and winters in western and central Mexico.

Bell's vireo has shown a steady decline based on breeding bird survey results from 1966 through 1996 (Sauer et al., 1997). It has suffered significant declines, especially in the lower Colorado River Valley and central and coastal California (Rosenberg et al., 1991; Franzreb, 1987 as cited in NMDGF, 1996). Loss and fragmentation of the dense riparian shrub-nesting habitat from various human activities and brown-headed cowbird parasitism appear to be the principal reasons for the decline of this species.

Bell's vireo is occasional on Fort Bliss and is not known to nest on the post. Two singing males established territories on McGregor Range in 1995 but no nests were found. This species was observed in an arroyo on McGregor Range in 1996 and in the acacia habitat on McGregor Range in July 1997 (U.S. Army, 1996g, 1997f). Based on its habitat requirements, potential habitat for this species on McGregor Range may occur in mesquite dominated areas such as coppice dunes or tall mesquite that grow around stock tanks. However, this species has not been recorded from breeding bird census locations in mesquite habitat in 1996 or 1997 (U.S. Army, 1996g, 1997f), nor have there been any records of it nesting at stock tanks.

Gray Vireo. The gray vireo (*Vireo vicinior)* is a State of New Mexico threatened species and nests in arid juniper woodlands on foothills and mesas, usually in habitat with well-developed grass cover (NMDGF, 1996). This neotropical migrant winters in northwest Mexico. Data from the breeding-bird survey indicate that this species has steadily increased in abundance from 1969 through 1995 (Sauer et al., 1997).

The gray vireo was heard singing, and was observed during breeding bird surveys in the South and Soledad canyons of the Organ Mountains on the Doña Ana Range–North Training Areas of Fort Bliss on

May 27 and 28, 1992 (U.S. Army, 1994d). One or two males were singing in oak habitat in South Canyon, while up to four individuals were heard in oak-juniper habitat in Soledad Canyon. This species was observed in the Sacramento Mountains foothills in 1979 (Smartt, 1980). However, this species was not recorded from six intensively surveyed locations within the pinyon-juniper woods in the foothills in 1996 or 1997 (U.S. Army, 1996g, 1997f) nor during gray vireo surveys elsewhere in the Sacramento Mountains foothills on McGregor Range in 1998 (U.S. Army, 1998l).

D.4.5 Mammals

Bats. Seventeen species of bats may occur on McGregor Range and nine are federal species of concern, including: eastern small-footed bat (*M. leibii)*, occult little brown bat (*M. lucifugus occultus)*, fringed myotis, cave myotis (*M. velifera),* long-legged myotis (*M. volans)*, Yuma myotis bat (*M. yumanensis)*, spotted bat (*Euderma maculatum)*, pale townsend's bat (*Corynorhinus townsendi)*, and big free-tailed bat (*Nyctinompos macrotis).* The spotted bat is also considered threatened in New Mexico. There have been essentially no surveys for bats on Fort Bliss so the status of these species of special concern is not known. Two maternity colonies of several hundred fringed myotis were observed in abandoned buildings in the Sacramento Mountains foothills on McGregor Range in 1979 (Smartt, 1980); follow-up surveys in 1998 indicated that a *Myotis* sp. maternity colony still inhabited one of these abandoned buildings. Behavioral characteristics indicated this was a fringed *Myotis*, but this was not confirmed (U.S. Army, 1998j). Surveys for bats along the Otero Mesa escarpment on McGregor Range took place during the late spring and summer of 1997 and in June 1998 (see Section D.3.3). No large roost sites were observed along the escarpment and sensitive species that can be heard, such as the spotted bat, were not recorded. *Myotis* sp. were recorded and could have represented sensitive species but species determinations were not made (USAF, 1997f, g; U.S. Army, 1998j).

Gray-footed Chipmunk. The gray-footed chipmunk (*Tamias canipes*) is a federal species of special concern and is not listed by the State of New Mexico. This species occurs in the woodland and forested habitats in the Sacramento Mountains foothills on McGregor Range. It has also been collected from the Otero Mesa and may be a resident of the canyons in the Otero Mesa escarpment (U.S. Army, 1998k).

Arizona Black-tailed Prairie Dog. The black-tailed prairie dog (*Cynomys ludovicianus arizonensis)* is a federal species of concern and is not listed by the State of New Mexico. It is probably the subspecies *C. l. arizonensis* (U.S. Army, 1996k). This species is a unique resource on Otero Mesa and it provides habitat for sensitive species such as the burrowing owl and ferruginous hawk and other wildlife.

A combination of survey techniques were used to study black-tailed prairie dogs on Otero Mesa, including surveys on foot and vehicle, extended observations in some prairie dog towns, counts of burrows, and vegetation analysis (U.S. Army, 1996k). A total of 10 active and 12 inactive prairie dog towns were observed on Otero Mesa on McGregor Range. Prairie dog density was low (less than 4 per acre); there was an estimated 399 black-tailed prairie dogs in 10 towns in 1996. In 1997, black-tailed prairie dog surveys were conducted on Otero Mesa and 16 towns were observed; 12 were active. The number of prairie dogs recorded in 1997 was 482, which is a 17 percent increase over 1996. Overall, there appeared to be population increases in all towns in 1997 compared to 1996. However, prairie dog densities on Otero Mesa are an order of magnitude less then densities reported elsewhere. The reasons for the low populations on the Otero Mesa are not clear (U.S. Army, 1998k). Sensitive species observed at the prairie dog towns on Otero Mesa were the burrowing owl and ferruginous hawk.